GPO 809679

HYGIENE OF THE VOICE

THE MACMILLAN COMPANY
NEW YORK · BOSTON · CHICAGO · DALLAS
ATLANTA · SAN FRANCISCO

MACMILLAN & CO., LIMITED
LONDON · BOMBAY · CALCUTTA
MELBOURNE

THE MACMILLAN CO. OF CANADA, LTD.
TORONTO

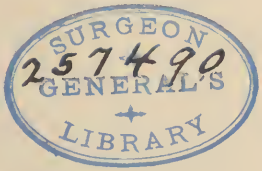
HYGIENE OF THE VOICE

BY

IRVING WILSON VOORHEES

M. S. (Princeton); M. D. (Columbia).

FELLOW OF THE NEW YORK ACADEMY OF MEDICINE; MEMBER OF THE AMERICAN ACADEMY OF OPHTHALMOLOGY AND OTO-LARYNGOLOGY; FELLOW OF THE AMERICAN LARYNGOLOGICAL, RHINOLOGICAL AND OTOLOGICAL SOCIETY; ASSISTANT SURGEON TO THE MANHATTAN EYE, EAR AND THROAT HOSPITAL; CONSULTANT TO THE TARRYTOWN AND TO THE ROCKAWAY BEACH HOSPITALS; ADVISER TO SINGERS OF THE METROPOLITAN, CHICAGO, AND CENTURY OPERA COMPANIES, ETC.



New York

THE MACMILLAN COMPANY

1923

PRINTED IN THE UNITED STATES OF AMERICA

Set up and electrotyped. Published August, 1923.

THE FERRIS PRINTING COMPANY
NEW YORK

To

IRVING WILSON VOORHEES, Junior

IN THE HOPE THAT THE MANTLE OF ELIJAH MAY FALL
UPON THE STRONG YOUNG SHOULDERS OF ELISHA,
AND THAT HE WILL DO HIS UTMOST TO
HELP WIDEN THE FIELD OF
MEDICAL SCIENCE

FOREWORD

This little book has grown up very gradually out of the Author's experience in examining, advising and treating singers and speakers. For many years he has made brief notes on many of the topics herein set forth *in extenso,* and has filed them away for reference. There was no thought of putting them into book form because of the many volumes that have already been written dealing with the singer's problems; but, in looking this copious amount of literature through, it was very evident that most of the writers have considered chiefly the technique of singing, and have tried to formulate rules and precepts which would help both the teacher and pupil to turn out a finished vocal product.

Now, with the technique, the *savoir faire* of singing, I have no very great concern. To be sure I have some sense of musical appreciation, and can differentiate readily between good and bad vocal production; but I do not presume to tell either teacher or pupil how a given method should be changed to bring about the desired result,—that is something which belongs exclusively to what one might call "Voxology," if the Latin-Greek hybrid will not offend the sensibilities of some Classical student or scholar. The singing teacher is just as much of a specialist in his line as the rhino-laryngologist is, in all that pertains to normal and abnormal conditions in the nose and throat. We both have our distinctive fields and should hew close to the line without invading each other's special prov-

ince. To my way of thinking, the voice physician has no moral right to usurp the place of the teacher; and, on the other hand, the teacher who advises the pupil as to gargles and sprays, and even "touches up" a throat now and then with some black and bad-tasting medicine from the corner drug store, is not only an invader and usurper, but he is practicing medicine without a license and ought to be held accountable.

The consummation so devoutly desired is the very thing that has nearly always failed to happen; namely, close co-operation between voice teacher and voice physician. On this subject I have discoursed in various periodicals, and have made it the burden of many an address before teachers and doctors. The matter is again referred to in the body of this book, but perchance, to little purpose, because of deep-rooted prejudices on both sides of the divide. We shall probably have to get on as we do now, cat and dog fashion, for many years to come, to the great detriment of all concerned. What a pity that human nature in the mass is so blind and stupid as to destroy its laborious efforts by its wanton follies,—efforts that have been paid for in the blood and sweat of all the generations of mankind that have ever lived! In which direction lies progress? Whence shall come the man who some day is going to be born with a great magic wand which shall unify and intensify and ultimately glorify all of our efforts? Will such a Leader ever be able to do away with the chaos now reigning in the fields of Medicine and Music? God grant it speedily!

It is obviously impossible to mention all the sources of information which have come to the

Author in the course of his reading; but the debt is fully acknowledged, and heartfelt thanks are offered to all those who have shed some light on disputed points, and have laid the fundamentals upon which our thought processes can erect a fitting superstructure.

Many of the data used in this book were published as original contributions by the Author in the Musical Courier, Musical America, The Étude, The Musician (Ditson Company), Musical Observer, and The Ladies' Home Journal. Articles appealing to physicians interested in the singing voice have appeared in the N. Y. Medical Journal, Medical Record, American Medicine, Boston Medical and Surgical Journal, The Laryngoscope, Annals of Otology, the *Acta Laryngologica,* and the Journal of the American Medical Association.

Of the authors consulted, special mention must be made of Sir Morell Mackenzie whose *Hygiene of the Vocal Organs* is probably one of the best if not *the* best book ever written on a similar subject. From this great voice physician many hints have been derived which are worked out in the light of more recent scientific findings and published herein. Sir Morell was a great pioneer student of vocal conditions in both singers and speakers at a time when the science of laryngology was still young and men were not moved to develop any particular corner of their specialty, such as bronchoscopy or plastic surgery, but contented themselves for the most part in syringing and wiping and spraying. All honor, then, to the man who became the foremost diagnostic laryngologist of his day, and set down conclusions and opinions which cannot be gainsaid. The world owes him its gratitude.

Other helpful authorities are: Holbrook Curtis, F. E. Miller, Wesley Mills, W. W. Shaw, Edmund Meyer, Thomas Fillebrown, and, of course, Emanuel Garcia, that great vocal teacher who gave to us the little mirror known as the laryngoscope. Among foreigners I must mention Imhofer, Flatau, Gutzmann, Ernst Barth, Morris Schmidt, Hajek and Schnitzler (the latter is father to Arthur Schnitzler, the doctor-dramatist), and the anatomist, Zuckerkandl of Vienna. All of these, and, perhaps others, whose names escape me for the moment, have contributed some little grain of truth, or have provoked thoughtful discussion.

In order to facilitate the reader in finding what he especially wishes to know, the book has been divided into two parts. Part I is for the general reader, teacher or pupil, who is not trained medically; therefore, technical terms have been avoided as much as possible, and every statement reduced to its lowest terms for the sake of clarity at the risk of being considered "unscientific." Part II is more difficult for the general reader, and is intended to serve physicians, or those with some knowledge of anatomy, physiology, pathology, etc., who might like to pursue their studies further later on in a more exhaustive and comprehensive volume. The chapter dealing with the diaphragm and the physiology of breathing is, of necessity, difficult and requires more than mere casual reading.

In conclusion I wish to thank Mr. J. N. Myers of the Macmillan Company who has helped much with his advice in seeing the book through the press.

CONTENTS

PART I

CHAPTER		PAGE
I.	The Beginner	1
II.	The Singer's Environment	13
III.	Range of the Voice in Speaking and Singing	18
IV.	Some Vocal Habits Which Handicap	23
V.	The Importance of Good Hearing	36
VI.	Colds—Their Cause and Cure	44
VII.	Voice Fatigue (Phonasthenia)	55
VIII.	Voice Teacher and Voice Physician	67
IX.	Vocal Hygiene	78

PART II

X.	Examination and Diagnosis	89
XI.	Physical Defects	101
XII.	Vocal Nodules	110
XIII.	On Certain Nose and Throat Disorders in Singers and Speakers	116
XIV.	The Tonsil Question	136
XV.	Hay Fever or Pollinosis	151
XVI.	Management of Acute Infections of the Airways	159
XVII.	Management of Chronic Infections of the Lower Airways	170
XVIII.	Functions of the Diaphragm and Some Notes on the Psychology of Breathing	182
APPENDIX A	Fundamental Principles of Breathing	194
APPENDIX B	Fundamental Principles of Voice Production	197

PART I

CHAPTER I

THE BEGINNER

The first question that every candidate for vocal honors should ask himself or herself is: "Is my voice worthy of cultivation?" It is almost impossible to decide this for one's self. In fact it is often difficult for those best fitted to help decide; for no wider differences of opinion are to be found in any field than obtain among self-constituted judges of voice. A voice is either pleasing or displeasing, and yet there are those who uphold absolutely contrary opinions even where so-called great artists are concerned.

Another question of great importance is: "What is my purpose?" "Is it for personal delight or to achieve fame?" If there is no intention of becoming a "virtuoso," but merely to give pleasure to friends and acquaintances, there can be no harm in "trying out" the voice.

The age at which a pupil should begin must be thoughtfully considered. There seems to have been no fixed rule as to this; for one hears of pupils "taking up" active vocal training anywhere between five and thirty-five years. These are doubtless the extreme limits in either case. All things considered, it is best to wait until adolescence is well estab-

lished. This holds true for both boys and girls. As every one knows, all voices are high up to the period of adolescence, when there is often a marked change for boys, and a less marked but distinct change for girls, if one watches the voice closely. The weight of authority is in favor of deferring vocalization till after puberty, especially in girls. Indeed many teachers refuse pupils before that period of life. The reasons given are that training at an earlier age would be likely to damage the voice by straining it while still unformed, and to endanger the general health by subjecting the system to fatigue beyond its powers.

There is, however, no strong argument against proper vocal discipline for the purpose of correct and pleasing speech as well as song, as early as five or six years of age. It is perfectly natural for most children at this age to desire to sing; and, taking advantage of this natural tendency, nothing but good should come from thoughtful, intelligent direction of it. Only simple little airs of limited compass should be sung, and the coordination of the laryngeal muscles with the ear (which is the conscience of the voice) should be thoroughly established. This can easily be done by invariably correcting every note about which there may be any suspicion of falseness. There is a better chance also of getting rid of throaty or nasal production at the very outset than when these defects have become ingrained by long habit.

So far from injuring the general health, the teaching of singing in childhood is likely to prove highly beneficial, especially in cases in which there is a tendency to delicacy of the lungs. By the

healthful exercise of these organs in singing, the chest is expanded, the muscles of respiration are strengthened, and the lungs themselves are made firmer and more elastic. Of course, it must be understood that the vocal exercises are to be strictly moderate both as to quality and quantity; that is to say, the lessons must be very short, and at most only the ten or twelve notes which form the average compass of a child's voice should be used. On no account must there be the least forcing or fatigue.

It may be added that some of the very best among living signers have been trained in quite early life. One need only mention the names of such "bright particular stars" as Mmes. Alboni, Jenny Lind, Adelina Patti, and Albani.

Training during the first years of childhood is, however, quite a different thing from training during the so-called period of mutation. In general I am opposed to singing during this changing period, and wish to align myself with the "old-timers," notably the late Manuel Garcia, that great teacher of singing who invented and gave to us the laryngoscopic mirror without which the science of laryngology could never have developed. On this question of singing during "the change," Sir Morell Mackenzie and Professor Garcia differed widely, and published their opinions *in extenso*. The debate, while lively, never became unfriendly, but served to illuminate the subject so that those interested may draw their own conclusions.

Garcia says: "Mackenzie pleads for singing exercises during the whole time of this critical period, and cites several celebrated persons in support of his views. I can bring forward a case which has not

yet been referred to. My father went through the transition time without ceasing to sing, and without having done himself the least harm. But both my sisters, Mesdames Malibran and Viardot, were obliged to wait a year. I continued singing myself,

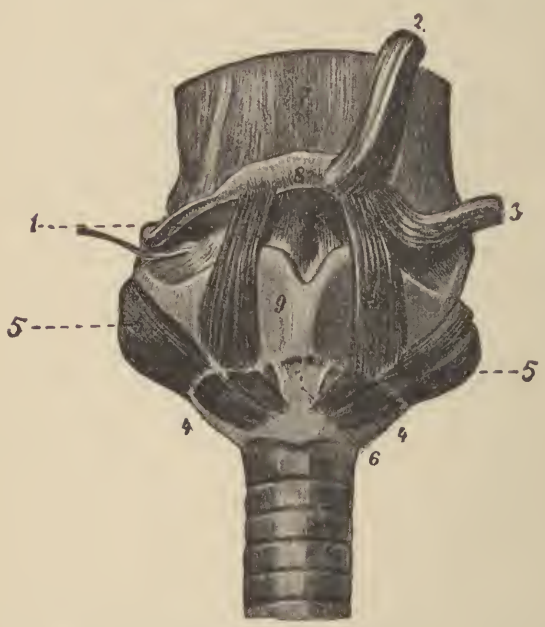


Fig. 1.—Larynx and trachea seen from the front. 1. Thyro-hyoid; 2. Omo-hyoid; 3. Sterno-hyoid; 4. Crico-thyroid; 5. Pharynx constrictor; 6. Conoid ligament; 7. Tongue; 8. Hyoid bone; 9. Thyroid cartilage.

and my voice was ruined. With all respect for Dr. Mackenzie's great experience in these matters, I cannot but believe that the old rule which has preserved so many voices, should not be thrust aside on account of some rare exceptions."

Laryngolgists have noted that at puberty the

larynx begins to grow quite rapidly. As a result the vocal cords fail to obey the normal voluntary impulses; therefore, in order to produce the desired effect, the pupil is obliged to squeeze the throat muscles tightly, and force the air through the narrowed chink between the cords (chink of the glottis). This rapid growth and resultant relaxation goes on for some months, during which time the voice cracks or breaks and seems hoarse. There is recession toward deeper or even low voice, to be followed by a progressively upward trend until the final level is reached.

The anatomical features of the change may be summed up as follows: Increase in size of the larynx in all dimensions; enlargement and consolidation of the cartilages (thyroid, cricoid, and arytenoid); the angle formed by the two wings of the thyroid cartilage in front becomes sharper and more marked, so that it is more prominent in the neck; lastly, the vocal cords become longer and thicker. In the female similar changes or physical modifications take place also, although to a much lesser degree; the voice gains a tone or two in compass, besides becoming stronger, richer and sweeter. This maintains throughout life, growing fuller, however, up to thirty or thirty-five.

In men, a second change occurs between fifty and sixty, or even earlier; the laryngeal cartilages stiffen and become wholly or partly calcified, and the soft tissues lose some of their elasticity. The voice then loses in power, volume and quality, until, in extreme old age, it becomes shaky and rather unpleasant.

On the basis of anatomical knowledge not only, but on the well-known and convincing grounds of

experience, I maintain that singing during mutation should not be indulged in to any extent. If it is, the results are likely to prove disastrous to all future efforts at training. Why is it that so few choir boys ever develop a voice that amounts to anything? What happens to the boy soprano prodigies? At the moment I cannot recall any of them who has ever achieved a considerable measure of vocal success.

Both parents and teachers of singing have overlooked this important fact in the past. Some physicians have even advised "a little singing exercises to keep the chords from becoming stiff." Such advice is, of course, based on ignorance of the exacting conditions present. Not frequently choir boys suffer from a form of voice trouble known as "phonasthenia," of voice weakness, a condition which will be fully described in another chapter, which is brought on by straining the throat at a period of life when it obviously should be kept as completely at rest as possible.

It is only fair, however, to present Dr. Mackenzie's side of the argument. He says:

"I pointed out some years ago that in all cases in which the voice is 'broken,' the vocal cords are seen, with the laryngoscope, to be much congested. They are often, however, somewhat red even when there is no particular harshness in the voice. The change sometimes takes place with startling suddenness as in the case of Lablache, who is said to have passed from alto to deep bass in a single day, but it is generally a gradual process which may take years to complete itself. Thus beginning, as a rule, about fourteen, it goes on steadily till the age of

eighteen or thereabout; after that, the development still continues, though much less perceptibly, and the voice is not usually full-grown, so to speak, before twenty-eight or thirty.

"If due care be exercised, there is no reason why the voice should not be used in singing during the transition period; but the training must be carried out within certain limits, and under strict supervision by a competent person. If a boy is found to have become slightly hoarse or uncertain in one or two upper notes, he must not be allowed to attempt them. In fact, he should be restricted to his middle notes, so as to avoid straining at the upper end of the scale, and give the organs time to mature themselves for the utterance of the newly-acquired, graver tones. For it will generally be observed that as the boy loses a high note he gains a low one, and these notes must be carefully but regularly trained.

"Unless, therefore, the larynx is much congested and the voice hoarse at the period of change, I am strongly of the opinion that vocal training should be continued—of course within certain limits—under competent supervision and with due precautions against overwork."

Prof. Mackenzie in answering M. Garcia has chosen to give us a few interesting notes on the Garcia family from which I quote the following:

"M. Garcia's father was a Spaniard, his real name having been Manuel Visconte Popula Rodriguez, but like many artists he changed it when he adopted the stage as a profession and took the name of Garcia. This gentleman was a native of Seville, but was taught as a chorister by an Italian *maestro di capella.* Señor Rodriguez had a great success in

Italy, where he was known as Lo Spagnoletto. His daughters, Madame Malibran and Madame Viardot, became the most celebrated artists of the day, whilst his son was the celebrated Manuel, who is so frequently referred to in this work. His grandson, Gustav Garcia, inherits the traditions of the school, and is a highly successful maestro."

It is very important to know just when the adolescent period begins. An industrious student of this matter, Dr. Theophilus E. Fitz, has shown that one can predetermine to a great extent just what the voice is likely to be, that is, whether soprano, alto, etc. It is a remarkable fact that in both sexes those who mature early have high voices, and those who mature late are inclined to have low voices. That is, if a female shows signs of passing on to womanhood at twelve or thirteen the voice will probably be a high soprano of dramatic or coloratura type; if sex maturation takes place at fourteen or fifteen the voice is likely to be contralto or alto. In cases where no change in the voice can be detected the high quality persists. Strongly sexed persons often show remarkable vocal qualities.

In boys the same rule holds good. If a boy experiences no "break," or at most a very slight break, he is likely to become a tenor. If the break takes place at twelve or earlier, the voice will be high; if at fifteen or later, the voice will be low. Nearly all boy sopranos become baritones or basses if any voice persists at all.

In Appendix C there is a chart showing the Fitz method of vocal measurements, and how to estimate what may properly be expected of any candidate for vocal culture who submits to the tests.

When a child is old enough, it is an excellent plan to take up a course in interpretation or expression, whether singing lessons are to be taken or not. Some years ago public speaking or "elocution" was a regular part of every school and college course. It has been nearly forced out of the curriculum by

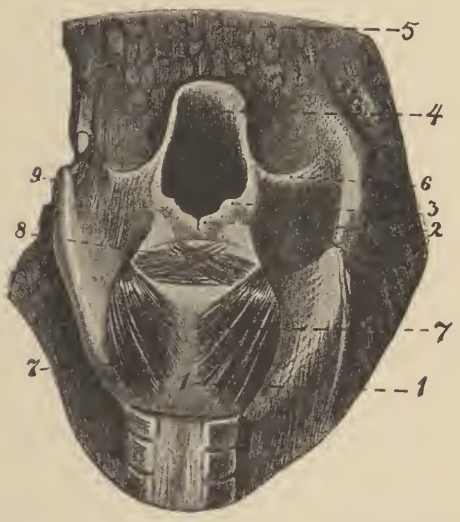


FIG. 2.—Larynx seen from behind. 1. Cricoid cartilage; 2. Cartilage of Santorini; 3. Cuneiform cartilage of Wrisberg; 4. Epiglottis; 5. Lingual tonsil; 6. Lateral epiglottic ligament; 7. Crico-arytenoideus posticus; 8. Interarytenoid muscle showing oblique and transverse fibres.

manual training, cooking and many other desirable auxiliary branches of a good general education; nevertheless it is most important, especially in America, where we are roundly criticised for our nasal twang and sloven speech. Along with such training, breathing exercises and gymnastics are of the greatest practical value.

Strange as it may seem, incorrect breathing is one

of the most common errors in vocal students. A violent attempt is made to fill the lungs with air, the throat is "set," and the pupil tries to force the entire effect, which is only too evident to the onlooker.

There are few persons who cannot learn to sing. Some authorities say that every one can be taught, even if the element of song seems to be lacking from one's mental and physical constituency. But however widespread, however universal the function may be, the gift of song is indeed rare. It is this confustion of function and gift (for talent) which is responsible for so much mediocrity and disappointment. The boy or girl born and reared far from great centers of culture thrills with pride when told by admiring relatives or friends that he or she has a wonderful voice, "a voice that should be trained for the opera."

Nothing more cruel could be thrust into youthful rustic minds than the idea that to cast one's lot in a great city means sure if not immediate success. Only the smallest fraction of those who come to New York ever amounts to anything. This sounds discouraging but is nevertheless true. Many hear the voice of victory, but few understand that it is not meant for them.

Ordinarily a few months of training will suffice to show the vocal possibilities actual or remote. One must then decide if singing is to be made a vocation in the true sense; that is, if it is to be made a marketable commodity. So many fields stretch out before the aspirant that it is well to choose one of them at the outset. The choice will probably lie between salon singing, concert, choir work, oratorio,

light opera, grand opera, vaudeville, etc. It is of great importance to know in which of these one is likely to find the greatest degree of satisfaction. By this time one should have a fairly definite idea of one's capabilities. It will be known, for instance, whether the voice is a lyric or dramatic soprano, mezzo-soprano, alto or contralto. The quality will be quite evident and the range and carrying power also. The pupil should be able to read simple music "at sight" and should be spending some time at the piano each day. The art of accompanying one's self while building the voice is well-nigh indispensable. It can be learned in a few months, and means to the pupil what shorthand notes mean to the college or professional student.

Vocal ability, especially quality and timbre, seem very often to be inherited characteristics.

Timbre is largely dependent on physical structure, and to a certain extent is seemingly an ethnoligical feature. Thus the aborigines (Maoris) of New Zealand, in whom the hollow spaces in the bones of the skull, technically called "sinuses," are very ill developed, have voices remarkably deficient in resonance. The Italian *ore rotundo* utterance is almost a racial peculiarity; and, if one may say so, the voice as well as the speech of Americans is a racial characteristic.

Tone work is of prime importance. For the first two years this should be studied intensively, so that the singing act becomes automatic. The tone should be free and easy, "sung on the breath," without any strained effect—that is, there should be only a minimum of effort necessary to secure a maximum effect. So-called "big tone" should be abso-

lutely tabooed. The pupil who goes home after the first lesson and tries to sing an aria from grand opera need not blame the teacher if his voice does poorly; yet such persons are frequent visitors to the throat specialist as a result of their folly.

The pupil is the clay with which we work. His impressions are easily moulded in the beginning and can be changed later on only with the greatest difficulty. His reliance upon the teacher and physician is, or ought to be, absolute. Good advice will make him; bad advice will mar him and the career which is a part of him forever. He should not be told too much about anatomy and physiology, or of the movements of the jaw, tongue, lips, etc. We must beware of the *idee fixe* teachers and voice specialists alike.

To sum up: Training of the voice should be begun as soon as the child can use language intelligently; that is, the child should hear good music and accurate speech, thus allowing imitation to play its very important part. He may be taught to sing little songs and recite simple rhymes.

The voice should be strengthened by frequent exercises not only indoors, but out-of-doors as well.

Good teaching is always necessary, no matter how great the natural talent.

Good singing is a help to good speaking, because it trains the ear to recognize pleasing sounds, and cultivates the sense of rhythm—training in song should, therefore, be a part of the curriculum of every school.

CHAPTER II

THE SINGER'S ENVIRONMENT

No matter what the art may be, every one who seeks to tread its sacred pathway must secure for himself the best possible external conditions, must, in other words, provide an atmosphere in which this art can live and grow. It is not enough to have developed a satisfactory technic and a large public following. If the artist stops here the art itself will stagnate and instead of progression there will come a retrogression. So closely are life and art bound together that to command and maintain public favor requires great mental as well as physical strength, charm of manner—in short, personality.

Singing is an esthetic calling dependent to a great degree upon mental attitude. Worry and fatigue show at once and create a depressing effect on an audience. A cruel, selfish, undisciplined nature cannot be expected in combination with beauty of tone and modulation of effect. The mind should be fed on the best there is in science, art, and literature. Only beautiful thoughts can be metamorphosed into beautiful expression; ugly, vindictive, ungenerous thoughts are sure to betray their possessor. In other words, vocal technic and a beautiful face and figure are not enough in themselves to carry an audience by storm. One has a duty to perform to the composer, to the public who comes to listen, to

the authorities behind the scenes, and to one's self. It is a serious matter, this vocalization, and deserves every thoughtful consideration.

Both the ear and the memory must be trained to analyze, to appreciate and to understand music as a

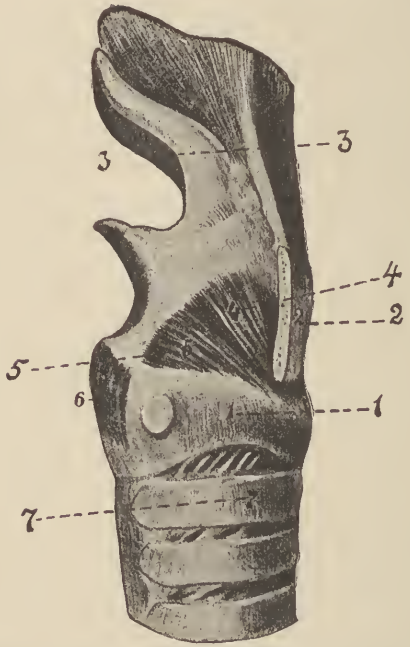


Fig. 3.—Lateral view of the larynx, right thyroid cart. removed. 1. Cricoid; 2. Thyroid cart.; 3. Epiglottis; 4. Thyroarytenoid; 5. Lateral crico-arytenoid; 6. Crico-aryt. posticus; 7. First tracheal ring.

science and as an art. Therefore, no opportunity should be neglected to hear great singers, not only to hear them, but to study out the secrets of their greatness, to reflect upon and to imitate all that is good in them. Then, when a high standard of ex-

cellence is set before the imagination, it is a very illuminating experience to hear some of the worst singers that one can find. This end will quite satisfactorily be attained by attendance at a few recitals by amateurs where every fault and evidence of bad method can be strikingly studied. This should not be done in a spirit of carping criticism, but should be approached from the standpoint of analysis, just as a scientist takes up the work of another scientist and proves or disproves it regardless of the merely personal element.

The question of foreign study is an open one. In the past much has been said and written both for and against it. There is no doubt that we have here in America just as good voices, and just as good teachers as exist in any European country. Nevertheless, there is a certain spirit of enthusiasm, an atmosphere of achievement which is not always found here save in the great musical centres such as Boston, Cincinnati, Chicago and New York. There is, too, a rare opportunity abroad for the study of languages, a mastery of which is very desirable from every viewpoint. French, German and Italian are the three that one should know sufficiently well to make them intelligent instruments of artistic communication. With the acquisition of them goes a degree of accomplishment quite outside the sphere of one's immediate work.

Happily in these days good music can be effectively studied from the phonograph. Nearly all the great artists have given us a record of their achievements, which will stand either to their credit or discredit until the end of time. The object of this study of "canned music" is not to supplant the

teacher; that is impossible, but for purposes of comparison, and to train the ear and sense of musical judgment.

One should also take up in synoptic form a history of music from the earliest times. It is profitable to know how the art sprang up out of barbarism and ignorance, and how it has developed into great universal, vital force among the nations.

The lives of the composers are also full of interest from a musical, biographical, and, not infrequently, from a literary viewpoint. Knowledge of the personal and often exceedingly human side of the world's great writers of music gives added charm to their compositions, aids the memory, and helps to an understanding of much that heretofore may have seemed quixotic and unintelligible.

Travel, while not absolutely indispensable, is a great stimulant and an increasing delight, especially in retrospect. By its influence, the powers of observation are widened and deepened, so that one comes ultimately to a wholesome perspective of national and individual likenesses and differences. It gives a feeling of assurance and a breadth of sympathetic understanding which are of great value.

In Europe, the demand for musical talent of every sort seems to be greater than the supply. Just how this matter stands in the post-war period is somewhat problematical; but in the past, Americans of talent and training have had little difficulty in getting "on the boards" when the time was ripe for it. Every European town of any size has numerous theatres, and, not uncommonly, an opera house as well, where stage experience can be acquired and a small honorarium besides. With this experience

back of one, there is usually an opening somewhere in America for the artist who returns to his native heath.

Just here it may be in order to say a word about the social demands made upon the singer's time and energy. To possess a pleasing, well-trained voice is often an open sesame to soirées, card parties, dinners, musicales and other like functions. In general, one should not accept such invitations, except in case of a fast and firm friendship. First, the effort and time consumed are precious. Unless one is willing to sacrifice everything else for experience, there is no point in performing without remuneration, and nothing is accomplished for the singer save to satisfy the curiosity or whim of a crowd that wishes free entertainment. Finally, the singer who is often obliged to comply with urgent requests, does not appear at her best advantage; and, unkind as it is, she may be the target for hostile, unjust criticism. Late hours, overeating, and overdrinking which are nearly always a part of such "affairs," work no good to the singer, and may lead her away from an industrious and serious pursuit of her art.

CHAPTER III

RANGE OF THE VOICE IN SPEAKING AND SINGING

The range of the voice is from two to two and one-half octaves, although in exceptional persons it may have a compass of three octaves. As most music, however, is written for voices which span about two and one-half octaves, there is not very frequent occasion for a wider range. Two of my tenors have had three octaves. One had a large experience at La Scala in Milan and followed Caruso when that celebrated tenor signed a contract with the Metropolitan. Unfortunately, however, he was a failure as an actor. The other is a German tenor, short of stature and with a thick neck. His cords are short and thick and very difficult to see by laryngoscopic examination.

Caruso had a compass of three octaves, but his method of production, from a strictly technical viewpoint, might be considered faulty. He was a law unto himself, and everyone who tried to imitate him, *Invita Minerva,* went "on the rocks." This is a good example of what happens to most singers who try to develop from a crow into a canary—they cease having even a crow's voice. And after all it is more creditable to be a good crow than a poor canary.

Efforts have been made by authorities writing on

the singing problem to differentiate between song and speech. We all know that the voice can be used in two entirely different ways—one for the purpose of communication with our fellowmen in speech, and the other for expression of the emotions or to produce an artistic effect through song. In singing

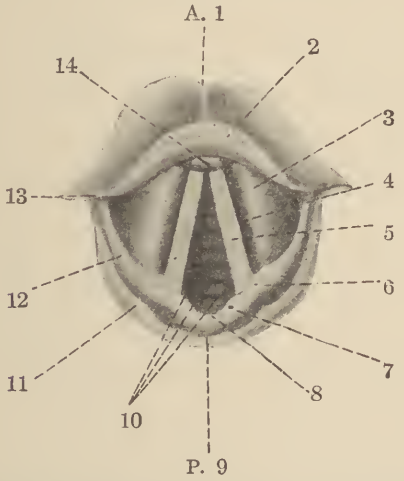


Fig. 4.—The larynx seen from above. A.—Anterior; P.—Posterior. 1. Median epiglottic ligament; 2. Epiglottis; 3. Ventricular band or "false vocal cord"; 4. Ventricle of the larynx, between the true and false cords; 5. Vocal cord (left); 6. Cart. of Wrisberg; 7. Cart. of Santorini; 8. Interarytenoid notch; 9. Posterior wall of pharynx; 10. Tracheal rings; 11. Pyriform sinus; 12. Ary-epiglottic fold; 13. Lateral epiglottic ligament; 14. Tubercle or eminence of the epiglottis.

there is a succession of identical, quick vibrations of appreciable length, making up a note. Speech is similar in production but the vibrations are fewer in number and shorter. For example, nä sung is quite different from nä spoken, the spoken sound being shorter and less pleasing to the ear than the sound when sung.

Mackenzie says that speech is to song what walking is to dancing. Herbert Spencer's definition is widely quoted to the effect that "song is emotional speech." This definition is, however, both inaccurate and untrue. Song is emotional, but it is not speech by any stretch of the imagination. One might assume that to carry a message from ear to ear is sufficient to be considered speech, but this is mere quibbling with words and amounts to nothing.

The voice is developed by many teachers on the vowel sounds a, e, i, o and u. These are capable of more wonderful combinations in song than are the twenty-six letters in the alphabet in speech. The remarkable thing is that each vowel has its own pitch, which is produced by the changing shape of the mouth. Anyone can satisfy himself by pronouncing or singing the vowels before a mirror. The vowels *o* and *oo* resonate best in the lower register, while *a*(ah) and *i*(ee) resonate best in the upper register.

There is no doubt that sex development influences the range of the voice to a very remakable degree. In females it is not uncommon to find the low voice type contralto or alto showing many masculine characteristics. The body is often large, the features heavy. There is likely to be an excessive amount of hair on the face, especially on the upper lip; and even the walk assumes a swinging stride which is not strictly feminine. Sopranos, on the other hand, are likely to reveal characteristics which are decidedly feminine, although, of course, the rule is very often broken. That is, it is impossible to say from external appearances just what either the quality or the range of a voice is

likely to be. It has been known for a long time that the voice of Eunuchs is always high and has a narrow compass. In fact, history states that in the early development of choirs, where soprano voices were in demand, castration was regularly practiced for the purpose of producing high voices. More will be said on this subject in another chapter. Most males are baritones, and their vocal compass lies between f and b flat. This explains why tenors of fine quality are so rare. The greatest effects in singing are in the upper and middle strata or registers. This for sopranos and tenors.

Singing increases one's ability to articulate spoken sounds. It is a well-known fact that stutterers never have any impediment while singing. One reason is that breathing while singing is entirely different from breathing while speaking, and many stutterers hold the breath and seem unable to release the spasm of the muscles in order that articulation may be effected. Speech usually occupies the middle of the vocal compass, because at that level the least strain is put upon the vocal apparatus and the voice carries better to most ears and is more distinctly understood. In many persons there are "islands of hearing." Some hear soprano voices best and some deep voices best. Every otologist will bear witness to this fact.

The matter of vocal registers has been very much disputed in musical circles, some teachers even refusing to make use of the word "register." But it is the *idea,* not the *word,* which is important. There is no denying that as one sings up the scale, he comes to a point where he must change his placement to produce the desired effect. This is the

point of "break" in the voice, or better, the critical point. The singer finds a place where he must make a new adjustment of the vocal organs. He can continue for a few more notes at this level, when another step or critical point again requires some shifting of the placement. These points vary in different persons, and it requires long years of practice before the voice is brought to such a state of perfection that no point of change is noticed by the vocalist. When building the range, it would seem logical to develop both ends of the voice from the middle, but in actual practice the range is increased from both limits. That is, a note is often added on the low voice about the time that a new high note is obtained; but sometimes, a new note develops on one end of the range corresponding to a loss of a note on the other end. The one great danger of developing the upper limit of the voice is "forcing," and it is this which leads to so-called "relaxed" vocal cords, vocal nodules and phonasthenia. While development of one's range to a maximum is very desirable, it is not an end in itself; for one may readily conclude, from what has been set down here, that excessive ambition to develop a high voice, for instance, may result in complete vocal shipwreck. There are many concert artists on the stage today who are able to earn a good living by the skillful use of a voice which is less than two and one-half octaves. By careful and intelligent direction other qualities will often make up for any lack of natural endowment. It is always well to bear this fact in mind.

CHAPTER IV

SOME VOCAL HABITS WHICH HANDICAP

THERE is no denying that many of the singers' ills are brought about by bad vocal habits which may be either the result of ignorance or bad training, or a combination of the two. In America, following out our usual haste for quick returns, singers do not do enough preparatory work before they undertake to make a living by their art. What would we say of a medical student who tried to depend upon his knowledge of medicine and surgery to gain a livelihood before graduation? Or what about a law student trying cases for pay before admission to the Bar? In both of these instances the law would intervene and prosecute the offenders for violation of the statutes. But the pupil who has had twenty or less singing lessons strikes out in vaudeville or cabaret work and boasts of making his expenses while learning.

At first view this seems to be a very creditable and delightful thing to do, but it is only true on the surface. Many persons who try this short cut never get any farther than the hedgerow. They never learn to mount the stile and sally forth into the broad path of artistic success. Why? Because their time and effort are to a great extent used up in doing a good thing poorly. If two years were spent exclusively in thorough, conscientious tone-

work, the singing act would become automatic, and with this foundation there would be at least some hope, even for those who are bold enough to apply the acid test in public. It would be a great deal better if the necessary money were begged or borrowed or earned in some other way during the first two pupil years. The only singing that should be indulged in during this time is the actual work at lessons and the daily practice hour. Voice, like the muscles, requires daily exercise in a systematic, regular way. When technic is thoroughly established, there should be no uncertainty, no huskiness or hoarseness or cough after moderate vocalization.

The attempt to do big "tone" work before the vocal organs are in any sense ready for it, is undoubtedly responsible for a great deal of so-called "catarrh" and "throat trouble" and unkind remarks about the climate and weather in general. Voice fatigue is more often due to bad placement and incorrect breathing than to any other group of factors. It is, of course, positively useless to swallow all kinds of troches and lozenges for such a condition. The latter are of some use in infectious sore throats, bronchitis, "colds," etc., but even then I, personally, do not recommend them. One cannot expect to treat a disease of the throat or lungs very effectively by putting medicine into the stomach.

Tremolo, a fault of which many singers seem to be blissfully unconscious, consists of a waver or varying in the intensity of the tone. It is often due to ignorance of breath control, and sometimes is deliberately cultivated by the singer in the false notion that it is "artistic" or a "sympathetic vibration" which will impress the listener favorably. It

is not a matter for the physician, but must be taken care of by the vocal teacher.

It is hard for a beginner to understand that breath control, and *not breath volume,* is the important thing, that one must govern the breath so that none of it shall escape without giving an equivalent of sound. The lungs must be sufficiently filled without gasping, not filled to overflowing as if one were going to have his chest expansion measured; for too much air may be quite unmanageable, the exchange of gases in the lungs being a physiologic requirement which must proceed with rhythm and regularity. One must be able to empty the lungs quickly or slowly, gently or violently as the exigencies of phrase and emotional interpretation demand.

Everyone should know quite exactly his natural vocal limits, and not make himself ridiculous by attempting to do things quite out of his reach, not only for his own sake, but to spare pain and discomfort to his auditors. First, in this connection, is an instinctive knowledge of distance,—so to modulate the voice that a fine well-poised tone will go "spinning" to the topmost gallery with the same ease as a note or phrase sung forte. If a singer hears his own voice very loudly there is evidently much rebound, and he is not being heard by others nearly so well as he thinks.

Falsetto is a faulty method of singing which has been frequently and widely discussed; but there is a distinction between falsetto and head voice which is not always clearly set forth or understood. These terms were used interchangeably by the old Italian writers; but "falsetto" is better used to describe an artificial method of delivery; that is, the limited

"short-reed" register in men which is forced upwards beyond its natural compass, or, as Rousseau defines it in his *Dictionaire de Musique,* "a kind of voice whereby a man going beyond the upper limit of his natural voice counterfeits that of a woman." Not only do opinions of definitions differ decidedly, but also opinions of beauty,—some being enraptured of the flute-like quality of falsetto, others finding it the most disagreeable of all human sounds. It cannot be gainsaid, however, that falsetto is really an artificial form of voice production, since young adults, who have naturally placed voices, never use it. There is a widespread feeling that falsetto is a trick, a kind of vocal quackery which is not to be indulged in by the genuine artist. Be that as it may, there is a form of head voice which is the natural successor of the chest voice in the vocal scale, and when it can be produced smoothly and without any break or flaw, so that a listener cannot tell when or how it is "carried over," it is capable of making great effects if not used too frequently.

Holmes maintains that falsetto is produced by the "rim of the larynx, which, instead of becoming dilated, suffers a progressive and marked constriction, until at last only the edges of the vocal bands can be seen through the narrowed orifice that remains." This is a satisfying, even if highly theoretical, explanation, but does not at all describe the head voice which is resonated from the highest levels of the nasal sinuses, the uvula being almost entirely drawn up into the naso-pharynx, thus shutting off the post-nasal space.

The differences between head voice and chest voice are chiefly as follows:

In chest voice, the vocal cords vibrate in their whole length, and the sounds are reinforced largely by the cavity of the chest, the walls of which can be felt to vibrate strongly when this register is

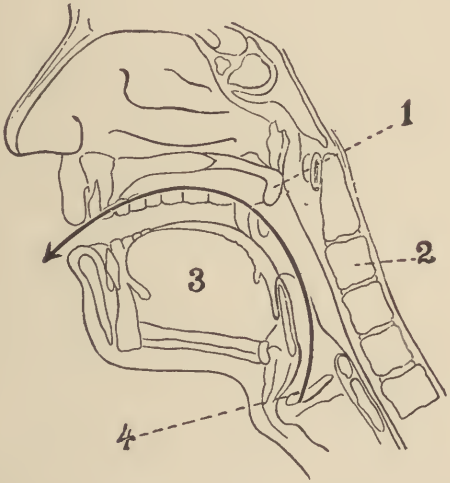


FIG. 5.—Closure of post-nasal space by uvula in taking a high note. 1. Uvula; 2. Vertebra of cervical part of spine; 3. Tongue; 4. Vocal cords. The arrow shows direction of vibrating tone and its reflection from the roof of the mouth.

used. In head voice, only part of the cord vibrates, and the sound is reinforced by the upper resonators, mouth, bony cavities of the skull, etc. It is this which has given rise to the absurd statements of singers that they could feel their head notes coming from the back of the nose, the forehead, etc. In the "long-reed" register (men chiefly) the pitch is raised by the increasing tension and lengthening

of the vibrating element; in the "short-reed" register (women), by gradual shortening of it.

Another common fault, which speedily becomes a habit, is the tendency to tighten or grip the throat muscles. This is a sure sign of bad training, or rather of no training at all; for no real teacher allows a pupil to sing "throaty" if he can possibly prevent it. Mackenzie says:

"A feeling of tightness in the throat in singing is an almost certain sign of inartistic production; it is especially felt when the voice is being used in a wrong register. The sensation is probably due to excessive contraction or even slight cramp of the muscles which form the wall of the pharynx. This "tightening of the neck" may also exist as a vice of production throughout the entire compass of the voice. It spoils the beauty and fullness of the tone and even, to some extent, accuracy of pitch by altering the shape of the resonator. Constant practice on the middle notes and in piano singing, swelling the voice out by degrees, and instantly stopping when the tightness begins to be felt, are the best ways of overcoming the defect.'"

This vocal defect is of especial importance because it lays the groundwork for phonasthenia which will follow as night follows day unless freedom of muscular action can be secured.

Sound is produced in the larynx, but articulation, or the transformation of meaningless sound into voice, is performed in the mouth; in speaking, therefore, the two parts work together, the larynx sending out a stream of sound, and the mouth, by means of the tongue, cheeks, palate, teeth and lips, breaking it up into variously formed jets or words.

The infinitely complex muscular movements that go to the making up of tone must be guided by art, not by brute force; whether the laryngeal outlet be narrowed or widened, the voice should flow through it with the liquid smoothness of a stream of oil.

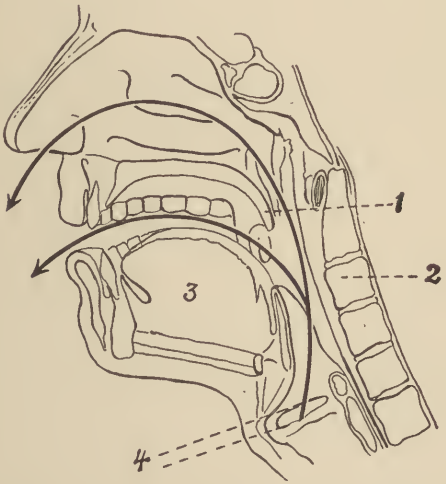


FIG. 6.—Position of uvula in taking a low note. The vibrating air column is divided, part going through the nose, part through the mouth. 1. Uvula; 2. Vertebra; 3. Tongue; 4. Vocal cords.

Approximation of the cartilages stretches, whilst separation of them relaxes, the vocal cords. Accordingly, we find that at the lowest part of the chest register the interval is at its widest, whereas in the upper, the gap entirely disappears, as can easily be verified by the singer's own finger.

Experiments on the living larynx have almost

all been made on animals. It need hardly be pointed out that no conclusive evidence about the mode of production of the human voice can be drawn from that of brutes.

"The first point in the training of the larynx," says Mackenzie, "is to insure the production of pure tone by accurate adjustment of the vocal cords. Each note must be 'held' without the slightest alteration of pitch or intensity, that is to say, with perfect steadiness and evenness. This may appear a simple enough thing, but like the goose-step of the recruit, it is the foundation of vocal discipline. When perfection has been obtained in this, the pupil's control of his voice must be still further increased by constant practice of what the Italians call the *messa di voce*, i.e., the holding of a note in a varying scale of intensity, beginning from the softest piano and swelling out by degrees to the loudest fortissimo and then back again in the same way to pianissimo in one breath. This is perhaps the most essential feature of artistic voice-production, and the utmost importance was rightly attached to it by the famous old Italian teachers, who made their pupils constantly practise it, and considered the possession of the power as one of the surest marks of an accomplished singer. If, as is commonly the case, the singer employs more than one register, the matter must be carefully studied, the special pecularities of every voice being most diligently investigated."

"The proper use of the registers is a point of the greatest importance in teaching. Some tenors can attain a very high pitch with the long reed (chest

register), and Tamberlik, Duprez, Maas, and a few others have been able to hold it, whereas most tenors experience great fatigue of the tensor muscles of the vocal cords if they sing very high notes in the chest register; indeed, the attempt often brings on serious congestion of the windpipe. On the other hand, by using the short reed (falsetto) such singers can produce charming tones without any injury to the delicate muscular apparatus of the larynx. Many persons can produce two octaves and two or three notes with the long reed, and do not find it necessary to shorten the vibrating element, but a large number of mezzo-sopranos can only reach their higher notes with the head register (short reed), and contraltos also usually employ this mechanism."

Interference is another vocal error which may become a habit, if persisted in for long. The chief kinds of interference are caused by improper use of the soft palate, tongue and false cords or ventricular bands. The pillars of the fauces, between which lie the tonsils, are frequently at the bottom of the difficulty and are often associated with tightness.

The pillars are attached to the sides of the throat near the back of the tongue. Now these ridges or pillars are in reality bundles of muscular fibres, one of which (the anterior) is attached to the tongue, whilst the other is directly connected with the upper cartilage (thyroid) of the larynx. Elevation of the soft palate must, therefore, *ipso facto*, tend to pull up the tongue and the larynx, an action which is assisted by the sympathetic contraction of the muscular pillars themselves. This explains

why the larynx, as may be verified by anyone for himself, rises in the throat as the voice goes higher, a change of position which some writers have regarded as an essential feature in the production of head tones. That it is not so is proved by the fact that falsetto notes can be sounded without any accompanying elevation of the larnyx, provided that the tongue be fixed. The larynx certainly moves a little downward towards the chest in the utterance of deep notes; this, however, is a conse-

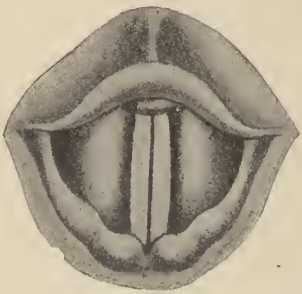


Fig. 7.—Position of the vocal cords while singing.

quence rather than a cause of low pitch, as the singer instinctively relaxes all the muscles supporting the organ so that the cords may be in the position of least tension. The lowering of the chin towards the breastbone is part of the same natural adjustment.

The inexperienced laryngologist may fall into error in examining the larynx, if he has had little or no experience with singers. It is of importance to know the normal, and then to know those slight variations which are only of importance if they lead one into the error of mistaking them for ab-

normal. Mere redness of the cords, for instance, is no indication of an inflammatory condition, or of an improper use of the larynx.

In some of the best singers, the vocal cords are never of normal color, i.e., pearly white, but always more or less red. Again, in determining the functional fitness of the cords, the manner in which they perform their movements has to be taken into account. As this depends much more on the efficiency of the nervous apparatus than on local conditions, it would not be wise for "the anatomico-physiologico-laryngoscopical vocalist" to trust to his own observations.

With respect to bad vocal habits, and the effort to acquire the opposite through thought and painstaking practice, one is sometimes asked whether silence preceding a performance is not wise; that is, would it not be a good thing to give the voice absolute rest before "going"?

Brouc lays it down as a rule that the most absolute silence must be observed during the whole day before using the voice in the evening. This counsel of perfection is, of course, for actors, but if the rule is sound it must apply to speakers of all kinds. It is hard to believe that such an ultra-Trappistical code is beneficial, even supposing that any one could be found to adhere scrupulously to it. That the voice should not be exerted as in prolonged declamation or even much speaking in noisy streets, cabs or trains, every one will agree to, but absolute silence would probably be rather injurious than otherwise.

As in all other matters of life, sound, practical common sense should govern the singer's acts.

Mackenzie cites the curious case of "a lady who was in the habit of drinking a glass of iced water immediately before going on the stage. To say nothing of the immediate shock to the nerves of the throat, the reaction that must inevitably follow such an application would be likely in less exceptional organizations to induce a degree of congestion that would seriously interfere with clearness of delivery."

There is not much to hope for in a person with so little plain "horse sense" as that, either from an artistic standpoint or as regards the simplest requirements for everyday happiness.

Defects of speech can sometimes be helped by a thorough mastery of the art of song, but many of these patients soon relapse into their old ways when away from the influence of the teacher.

Stammerers and stutterers should carefully avoid each other's company, and children of markedly nervous temperament should on no account be allowed to associate with persons who have any impediment or even singularity of speech.

Defects of utterance can be cured only if the cause is recognized. For stammering nothing can be done unless the sufferer can learn to use his breath properly. The instructor's efforts must be mainly directed to teaching his pupil to acquire some degree of control over his diaphragm and other respiratory muscles, so that the air or motive power shall not be allowed to leak away before the vocal apparatus can be got ready for it.

"In one of the worst cases of stuttering that I have met," says Mackenzie, "the utterance was always improved by small doses of strychnia, whilst

the sufferer was almost deprived of the power of speech by tobacco."

Relief measures group themselves naturally into gymnastic and mechanical measures. The aim of the former is to make the pupil acquire a proper control over his organs of speech by means of regulated exercise of the breathing apparatus and of the tongue, whilst the latter seeks to help him by means of instruments which serve to hold up or keep down the tongue.

The importance of securing a satisfactory teacher in these cases cannot be overestimated. To quote Mackenzie once more:

"Patients have been brought to me who had lost all control over the voice, not from any disease or organic defect, but solely from nervous disturbance, caused by a blustering or unsympathetic master. It is as though one were violently to shake and pull about a watch whenever there is the least failure in the precision of its action."

Harmonious co-operation is the watchword of success in all difficult cases, no matter whether the mentor be teacher or physician. No matter how eminent the instructor, a pupil is not going to advance if she is half frightened to death, or if she develops any sort of antipathy to a personality or method.

CHAPTER V

THE IMPORTANCE OF GOOD HEARING

In the chapter on "colds," mention is made of the fact that a common result is aural abscess with impaired hearing. As a matter of fact, we may safely say that fully 90 per cent of all difficulties with hearing arise primarily from some nose or throat infection. Very often the infection has been unrecognized or forgotten, but if the patient reflects carefully, the sinister influence of some antecedent nasal disease makes itself manifest.

Of the more severe types of disease causing ear trouble, scarlet fever is the commonest. In fact, it is rather unusual to examine a person who has had "scarlet" without finding some evidence of invasion of the ears by this dread malady. At the New York Institution for the Deaf and Dumb, where I served at one time as aural surgeon, a large percentage of the children had survived a severe scarlet fever infection successfully, only to be obliged to exist for the rest of their lives minus that special sense which, with the single exception of vision, is the most important to human economy. That this should be so is exceedingly unfortunate; for, as yet, it is impossible to immunize or abort scarlet fever, chiefly because the germ or exciting agent is unknown. Complete isolation of infected children has done much to prevent its spread, but the interweaving

of human relations is such that absolute quarantine is well-nigh impossible.

Cases of "hereditary deafness" are ordinarily described in the text-books, and are reported as such by writers in the medical journals. In the last analysis it is very doubtful whether deafness can be inherited. The predisposition is there, to be sure, just as it is in some cases of pulmonary tuberculosis, but the actual cause is probably not inherited—this portion of the body is merely less resistant than it should be, and cannot throw off the infection once it is encountered. In any event, we *do* know that "chronic catarrh" of the nose is very prejudicial to the hearing, particularly if it is of the post-nasal variety; that is, where there is a good deal of dropping from the back of the nose to the throat. Such cases must be studied and treated with diligence, and every effort must be made to build up the patient's resistance against catching cold. The new vaccine therapy offers some prospect of help when used judiciously.

There is no doubt that many singers have defective ears. "The difference in most cases between singers and those who have 'no voice' is really a defect of ear on the part of the latter, who are naturally unable to imitate sound, that is, reproduce gradations of pitch, which, as a mater of fact, they either do not hear at all, or only imperfectly." (Mackenzie.) It is not always simply a question of removing a little wax and letting it go at that. The idea of pitch may be quite different in the two ears, owing to middle ear diseases, or it may be of congenital (birth) origin. A thorough examination of the singer's vocal powers must include hearing

tests, and tone judgments. Some musically inclined people have no idea of sound as distinguished from noise. This is a misfortune akin to being born with one arm, but fortunately it is more amenable to treatment. The sense of musical sound can be cultivated to limits almost beyond the imagination, if sufficient pains be taken to secure accuracy. Standards of tone are furnished by the world's greatest artists who have the gift of a "musical ear," fortified by assiduous practice and cultivation. In this age we are particularly fortunate in having the phonograph as an aid in cultivating our hearing from the musical side; for in those who are not geniuses, the fountain spring of success in any art is conscious and laborious imitation. Only in this way can greatness be understood even in a moderate degree. Cultivation of a so-called musical ear is dependent on normal hearing, to begin with, reinforced to the saturation point by the best that can be heard. It is the old question of having the physical and psychical elements fundamentally normal, and then going ahead on a sound basis to cumulative development of the highest form of art which one can hope to reach in the short span of human existence.

Relatively few cases of impaired hearing begin with violent symptoms. More often the process goes on insidiously, so insidiously that a great deal of acuity is lost before the afflicted one becomes aware of his handicap in the struggle for existence. Quite often it is discovered at table that some member of the family is always asking that sentences and phrases be repeated. When words uttered singly are misunderstood, the damage to hearing has

become extensive, and treatment may be of no avail. An intelligent person always fills in unconsciously from the context of what was said, if the sentence is of any length; but in the short sentences definition of sound is more difficult, and mistakes are frequent. Rhyming words having a difference of only one letter are most frequently mistaken, and are sometimes the cause of much merriment at the expense of the defective listener. Very often such mistakes are put down to inattention, or the unfortunate person is chided for having "wax in his ears." All of us have in reality a gift of hearing which is much greater than our actual needs for the ordinary purposes of life; hence a very considerable amount of hearing may be lost without our becoming conscious of the defect. Upon examination, such persons are surprised to note the difference of acuity in the two ears.

In a quiet room, with the patient standing profile to the examiner, doors and windows closed, the eyes shut, one should hear an ordinary whisper at twenty feet. The watch should be heard at from six to fifteen feet, and all of the tuning forks should be detected at any reasonable distance. If this does not work out, then there is some defect in hearing which must be diligently studied and analyzed by the ear specialist (otologist or aurist).

How does ear trouble begin? Does it come by way of the external ear channel? No, not often. A great many people think that stuffing cotton into the external canal before bathing is absolute protection to the organ of hearing. This is a mistaken idea; for, if the drum is intact, it does no harm whatever for water to enter the canal,—in fact, no

amount of water can stay in this canal, any more than it can stay in a bottle when turned upside down. It is all right to wear cotton for the relief of external pressure, if one is sensitive to that sort of thing, but it does no good as a preventative of hearing difficulties. The reason for this is as follows:

The middle ear is a small cavity in which the little bones—hammer, anvil and stirrup, as they are called, are located. These structures are separated from the external canal by the drum or tympanic membrane. Leading from the middle ear cavity to the throat is a channel called the Eustachian tube, after an Italian anatomist, Eustachius, who first described it. This arrangement aims to maintain a balance between the atmospheric pressure against the drum from the canal, and the pressure from within the tube, If now, the tube be closed by any swelling or disease process, then the air in the middle ear is absorbed and the drum is driven inward by external pressure in the canal. However, in swimming, there is a great tendency for water to rush into the Eustachian tube as well as into the external canal. This water in the tube has great difficulty in finding its way out, owing to mechanical conditions present, and hence the peculiar feeling of fullness after swimming. If the water is relatively free from germs and irritating foreign particles, it is ultimately absorbed, or drains off slowly into the throat and no harm is done. On the other hand, if disease germs are at the back of the nose and are washed in with the water, they find a favorable soil for development and may form an abscess or set up a chronic, progressive inflammation. If an abscess

forms, the drum ultimately breaks unless opened with a knife, and the abscess contents escape. If no abscess forms, but only constant irritation goes on, then the delicate middle ear structures become thickened and finally the nerve of hearing becomes involved also. After this stage has been reached, treatment is of little or no avail, for there is no known method of restoring such a nerve to function. I have used water as a convenient aid to help the reader understand the process of infection, but in many cases the patient has not had his head under water for years. In such instances the infection is blown in while blowing the nose, or it may work its way along the structure of the mucous membrane from some nasal or throat focus (extension by continuity).

If there is any water or mucus at the back part of the nose (naso-pharynx), one should not blow the nose violently for there is great danger of inflating the tubes and carrying the foreign substance directly into the middle ear. It is much better to pull the air back through the nose thus cleansing the naso-pharynx, or as it might be phrased, "it is safer to blow the nose backwards than forwards," for by this method no extraneous matter can go where it may be harmful.

A great many patients, not only singers, but those in other callings, come in with some vague pain or tenderness around an ear and ask whether by any chance they may not be getting up a mastoiditis. Of that disease there seems to be as much dread as of small pox, and, therefore, it may be in order to say a reassuring word.

Mastoiditis always follows an infection in the

nose or naso-pharynx; that is, there is a very bad cold in the head, usually with thick, yellow discharge ("matter") which eventually gets up the Eustachian tube into the middle ear. One then experiences excruciating pain in the ear owing to a stretching of the drum by the fluid within the middle ear cavity which is trying to find a way out but cannot get back into the nose because of the swollen condition of the tubal lining membrane. The fluid is, therefore, trapped; and, following the line of least resistance, breaks through the drum and discharges through the canal, staining one's pillow or an applied piece of cotton. If an ear surgeon sees the condition early enough, that is just when the drum is swollen and bulging, he will make an opening in the drum with a very fine instrument and let the discharge out. Some people prefer that the abscess break spontaneously, but this is unwise as the condition seems more likely to become chronic owing to a persisting perforation of the drum. One is often asked if incision of the drum does not cause deafness. The answer is positively *No.* There are a great many people going about their daily tasks who have been obliged to undergo what is called a radical mastoid operation for the cure of chronic discharge. In this operation, not only the drum, but the little bones in the middle ear called the hammer and anvil, are entirely removed, and the bone cavity left behind becomes entirely covered with skin, but in spite of that a whisper can be heard at from six to ten feet. In other words, after a middle ear discharge dries up, the hole in the drum heals and the hearing is practically as good as it ever was.

The ear surgeon sees a number of these cases dur-

ing the summer months, and they are usually the result of bathing, particularly diving. It is a common sight to see a bather come out of the water and blow his nose violently instead of pulling air back through his nose as explained above. This is a practice so dangerous to the ears, and, ultimately, even to the life of the patient, that wide publicity should be given to its possible pernicious results. Putting cotton in the ear canals does no good, of course, as water does not get in by the external route if the drum be intact.

CHAPTER VI

COLDS—THEIR CAUSE AND CURE

I VENTURE that if any one were to ask the authorities at the Metropolitan Opera House this question, "What is the usual reason for making a change of bill in your arrangement of performances?" the answer would be, "Because Mme. X is ill with a cold and cannot appear." Of course, this is not always a valid reason; for "a cold" is a very convenient excuse, and is ordinarily quite acceptable, but, as a matter of fact, it requires a very little cold to put a very big singer quite out of the running, so to speak. A cold is usually accepted as something inevitable, and the average person does little to alleviate it save to swallow a few "rhinitis tablets" and drink a hot toddy. These measures, while sometimes effectual in other persons, often fail in singers because they do not relieve the local condition in the nose and throat in a way that permits satisfactory use of the voice. Camphor, quinine and belladonna are the drugs ordinarily used in the above mentioned tablets, and, if taken in sufficient quantity to afford relief, they dry up the secretion too quickly and parch the mucous membrane. As every singer knows, a dry throat is fatal to good tone work.

Every year there seems to be an increasing number of singers who are suffering from vocal impairment as the result of an acute respiratory disease

which has gone on through neglect or incompetent treatment to a chronic state. Many of these remember having "sung through a cold" or grippy condition. A large number are suffering from chronic laryngitis or bronchitis and have a constant desire to clear the airways of secretion, which is always a persistent symptom. Vocal uncertainty is always an accompaniment of such a condition, the voice being good one day and bad the next. In spite of all the various singing methods which are

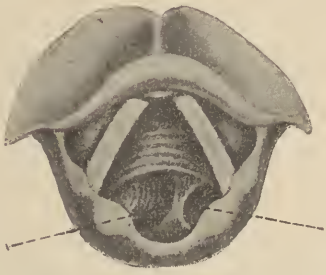


Fig. 8.—Position of the vocal cords on deep inhalation showing the trachea divided into 1. Right bronchus; 2. Left bronchus.

supposed to cure such an infection, it persists because the bacterial cause is still present deep down beneath the mucous membrane and cannot be permanently routed out. Anyone who understands the pathology of these conditions will readily see that no amount of vocalization or breathing exercises can ever hope to effect a cure.

Grippe and colds, like the proverbial poor, "we have always with us," and, like the poor, too, grippe and colds are very often neglected. Therefore, a widespread campaign of enlightenment and elucidation is in order if the general public is to know how

the ravages of these dread diseases are to be combated. Of the two, grippe is especially protean in its manifestations, attacking now the lungs, now the gastro-intestinal system, or again the nervous system without apparent rhyme or reason. During 1916 there were many cases of abscess in the ears and complications in the nasal sinuses. In 1917 we had a return to the primary lung involvement type with fatal pneumonia as a frequent sequel. It is extremely important that a warning be sounded against temporizing with this stubborn malady. Prompt and effective local treatment is the only safe way to prevent a prolonged period of convalescence.

Grippe, like colds in general, is an acute infectious disease which is contracted from some person previously infected. It is not a visitation of Providence in retribution for sin, as some well-meaning persons who cling to the old theology seem to think, but a germ disease which can be definitely studied under the microscope. In the beginning it is purely a local condition as evidenced by sneezing, coughing, sense of tightness or fullness, watery eyes, discharging nose, etc. These are all early symptoms, and it is at this stage that influenza can be cured or aborted by effective treatment. Later, when the system is reacting to the effect of the toxines absorbed from the site of the original infection, there are headache, rapid pulse, fever, pains in the muscles and joints, depression, and a whole train of other distressing symptoms.

A cold is something more than an annoyance. It is, in many cases, a real danger, because under the mask of a simple "acute catarrh" may be lurking the dread germs of pneumonia or tuberculosis. If

the infectious nature of colds were better appreciated, they would have to be reported to boards of Health along with scarlet fever and diphtheria. To be sure, most people recover from a simple rhinitis or laryngitis in due season in spite of, or because of treatment as you wish, but who can say that colds do not furnish the soil and lay the stratum for many other diseases, both acute and chronic? A few months ago, the Commissioner of Health of New York City made strenuous efforts during an epidemic of influenza to educate the public against spreading diseases by droplet infection. It was an impossible task, but it was worth trying. We ought to wage perpetual warfare against the ignorance and carelessness of those who cough and sneeze in public places without protecting the face with a handkerchief. It is, after all, such a little thing to do, to learn how and when to use the pocket handkerchief. Expectoration on the floor of a car, while disgusting, is much less dangerous to health than the sputtering of fresh, germ-laden spray into the air which must be breathed by defenseless passengers. The peculiar, pervading odor after a sneeze gives one a vivid idea of how great a number of persons can be infected from this one source alone. Sneezing and coughing are both cleansing acts. The mucous membrane of the nose and throat rebelling against the presence of some irritating, foreign agent, experiences a reflex nerve-impulse and endeavors to shake off the intruder very much as a horse, by wriggling the skin, shakes off flies in summer. The old idea that "a fit" of sneezing in an audience was simply due to unconscious imitation is no longer tenable. Particles cast off by some one

having a cold are inhaled by susceptible persons, and eventually the whole audience may become infected.

It is a momentous fact that practically all of the acute infectious diseases of childhood begin as nose and throat difficulties. In measles, there is the watery eye and running nose; in scarlet fever, there is the peculiar, red, strawberry tongue; in diphtheria, the whitish patches from which alone the expert diagnostician can make his diagnosis. Recently it has been determined that acute anterior poliomyelitis (infantile paralysis) begins as a nose and throat infection. These examples ought to be sufficient to convince any one of the ease with which all air-borne diseases can be carried from one person to another. With every breath, we are capable of drawing in the germs of some infectious disease. Why is it, then, that everybody is not constantly ill with one or another of these pestilences? Because the nasal secretion itself is capable of destroying a large number of the less virulent germs owing to its bactericidal power. Then, too, a very resistant person has a large supply of "antibodies" in the blood, capable of neutralizing toxins, which prevent active symptoms of disease from becoming manifest.

The acute respiratory infections lie no longer within the province of the general practitioner, but must be relegated entirely to the nose and throat specialist. No amount of drugs taken into the stomach can ever do much toward the cure of a condition which is not even remotely connected with that organ. When one has a "boil" on the neck, he wants the boil treated directly, and not

some other part of his anatomy. The offending bacterium must be killed with antiseptics and routed out of its nest. A cold or a grippe attack is just as much an infection as a boil,—in fact, it may be caused by the same organisms. The mucous membrane of the nose, throat, larynx, trachea and lungs must be treated directly by application of antiseptics. These antiseptics must enter every nook and cranny which can be reached. No other method has the same effect as direct application of a sufficient quantity. Fully fifty per cent of the cases of "chronic catarrh" and sinus disease one examines in daily practice, have never been treated by the direct method. Most of them have supported the corner druggist for some years in the mistaken notion that they were saving money, only to find eventually that they will be obliged for the rest of their lives to put up with the annoyances and distress incident to the activities of an incurable condition. Nearly every disease in its very beginnings is curable; chronicity is simply another word for neglect, and neglect is the handmaid of ignorance.

The purpose of this chapter is to caution singers particularly against continuing their work after the acute symptoms of an infection have begun. Most vocalists think that an engagement outweighs every other consideration. The singer feels that he "simply must appear," and just as likely as not gets out of bed, braves wintry blasts and crowded conveyances, exposes himself to the drafty back stage, and makes a poor showing which is not discounted in the least by public or critics who, of course, can know nothing of the laborious effort or inward

anguish. Several medical consultants may be seen in the singer's apartments on the day following, most of whom do little more than look serious. There is nothing that a physician dislikes more

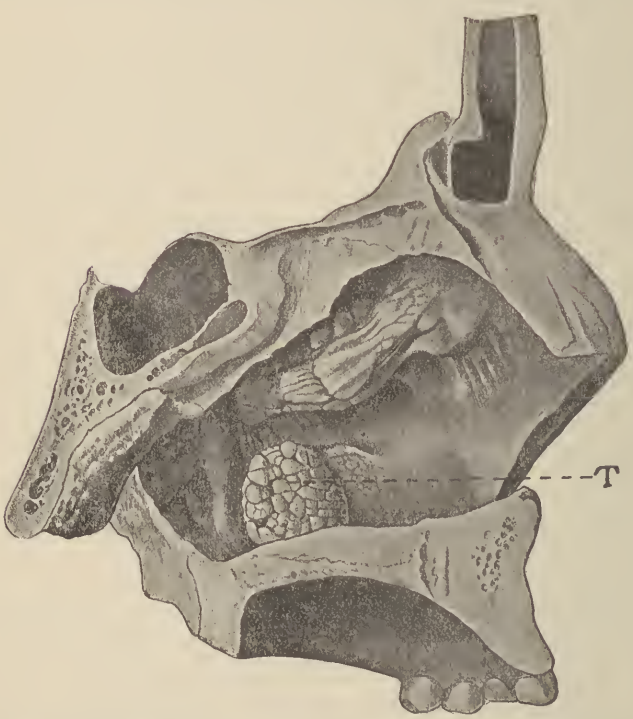


Fig. 9.—Enlargement of the inferior turbinate, ending in strawberry-like posterior tip (T). Such a condition causes nasal obstruction similar to adenoids, and post-nasal dropping of mucus.

than to be called in at the eleventh hour. It is usually very unsatisfactory to everybody concerned. The disease is then thoroughly established and difficult or impossible to cure.

When a cold is once under way, what can be done to check it? Many have been the articles written in medical books and journals concerning the treatment of colds. Some of these are helpful, more are worthless in so far as singers are concerned; for the requirements of the latter are special and peculiar. It demands very special observation and experience in treating singers to do good without doing harm. First of all, self-medication at home is not to be recommended, because nobody can see into his own nose and throat in a way to make self-medication effectual. Local appearances and conditions change from hour to hour, and it requires expert judgment to know just what to do and how to do it. Self-medication is often fostered by the tender ministrations of an obliging druggist, who feels in duty bound to placate a customer by handing over the counter anything that the law allows him to sell without a prescription. It is unwise to ask the advice of a pharmacist in matters medical. He is in his place of business to sell drugs on the order of a physician, *not to prescribe* them. In fact he is not trained to prescribe, and when he becomes ill he must call in a medical adviser just like one who knows nothing of remedies. Drugs sold over the counter for the relief of colds are: phenacetin, salol, quinine, aspirin, troches, lozenges, etc. For a cough, some compound cough mixture is usually administered which upsets the stomach, and makes the last estate of the patient worse than the first. A cold in its beginning is a local not a constitutional disease, and should yield to local measures. Just so soon as the local symptoms are

cleared up, the constitutional symptoms, if any, subside.

At the very beginning of a "a cold" there are some don'ts which should prove of service:

Don't wait to see if the tight feeling in the nose and throat, the watery eyes, the altered vocal quality are "going to amount to anything."

Don't consult your druggist or even the family physician unless he is thoroughly equipped to treat your condition locally.

Don't think you are showing your heroism by "fighting" against the infection and going about your daily work as if in the best of health. You are doing nothing of the sort,—in reality you are aiding an unseen enemy who will surely defeat you sooner or latter.

Don't swallow rhinitis tablets, aspirin, calomel, hot whiskey and patent medicines in the first stage of your malady. You are wasting valuable time. At this period your specialist can cure you in two or three visits. Later on he may not be able to do it at all.

It would seem that the logical method of treating a cold is not to administer remedies by stomach, if no condition there requires attention, but to apply such remedies directly to the site where action is desired; that is, into the nose in acute rhinitis, or into the throat when active inflammation is located there. In dealing with these acute infections in singers, the two remedies most often used by the specialist are silver in some form or iodoform. The silver salts, while irritating and unpleasant, are efficacious in many cases. Iodoform has such a persisting, penetrating odor that it is very objectionable

to many fastidious persons. It is most frequently suspended in oil or ether and sprayed on the inflamed parts.

During the past ten years I have been using with good effect, certain well-known antiseptic principles —not as a spray, but in drop form applied directly to the mucous surfaces. The results of these investigations were published in the *Boston Medical and Surgical Journal* of November 4, 1915. This combination is mildly antiseptic, relieves congestion, cools and partially anesthetizes the inflamed areas, and gives the patient a pleasant sense of exhilaration for two or three hours. An ordinarily severe bronchitis will clear up in from forty-eight to seventy-two hours by this method. In acute laryngitis the relief is immediate.

In acute bronchitis with severe coughing, it is astonishing how effective treatment may be. The oily vehicle which carries the aromatic drugs heals and lubricates the irritated mucous membrane, and in a few hours a marked change for the better is seen, the sufferer expressing himself as very highly gratified at the improvement.

A certain patient is subject to sudden, severe attacks of laryngitis in the spring of each year. She loses her voice completely for weeks unless treated. In May, 1922, she appeared at my office absolutely voiceless, even whispering was difficult for her. Upon examination the entire larynx was found red and swollen, the vocal cords were thickened and covered with sticky mucus, and the whole picture was one of intense inflammation. Four treatments were given, one in the morning, and one in the evening for two days. On the third

day the voice was entirely normal, and the patient was discharged.

A word must be said in favor of the use of vaccines in some cases, especially where there is a tendency to oft-repeated attacks either of rhinitis or bronchitis. A culture is taken from the nose or throat as the case may be, and an effort is made to identify the predominant germ. This done, a vaccine is made from the dead organisms which have been destroyed preferably by chemicals, and, when properly standardized, this vaccine is injected through a fine hypodermic needle beneath the skin of the patient. As a rule there is very little reaction, and the patient is entirely able to keep at his work. Several such injections may be required before the susceptibility is reduced to a point where catching cold is rendered difficult.

There are also several good stock vaccines furnished by pharmaceutical laboratories. These are all ready for use by the physician and save a great deal of time and trouble in preparing the cultures. In my hands, however, they have not always proven to be as effective as vaccines made from a patient's own excretions.

That a cold should never be neglected was well exemplified during the epidemic of influenza in the winter of 1915-16. Many neglected cases experienced complications in the nasal accessory sinuses necessitating operation; while others developed abscesses in the ears, and went through a painful siege for some weeks with ultimate diminution of hearing.

CHAPTER VII

VOICE FATIGUE (PHONASTHENIA)

THERE seems to be a dearth of information concerning voice fatigue in singers and speakers in our American periodical literature, although it was recognized as a pathological entity as far back as 1600, when Fabricius Ab Aquapendente expressed his views on the subject in a rather laborious essay. In England, the condition was long known as clergyman's sore throat, while in France it was named more accurately by Mandl *fatigue de la voix.* In 1906, however, it was scientifically and accurately described in a little brochure entitled "Functional Weakness of the Voice in Singers, Speakers and Military Officers." In that monograph, Flatau not only gave a clear exposition of the entire matter, but recommended and described a rational and successful therapy.

Weakness of the voice, or phonasthenia, as it is now commonly known, is a disturbance in which a given voluntary impulse to the vocal bands is not followed by a normal tonal effect—that is to say, the produced tone is higher or lower than the intended tone, is unpleasant to the ear, and has no staying nor carrying power.

The fundamental cause of this difficulty is in many cases faulty voice placement. Just as many people never learn to walk gracefully, many never

learn how to get the most out of their voices. In America we seem to be particularly unfortunate in our speech habits, so much so, that our so-called nasal twang and careless pronunciation make us a butt for ridicule in many foreign countries, where we go to exchange good American dollars for as much Old World culture as we can assimilate within a few short weeks.

As an expressionist friend* has very tersely put it—"Americans returning from Europe hear for the first time the raucous, sharp, high-pitched, nasal, unmusical voices of their countrymen. Their national self-complacency has been punctured, and they set about correcting what to them has become an offense. The actor has always recognized the need for a pleasing expressive voice under perfect control. Ministers who deal with the greatest subject that has ever engaged the mind of man—the destiny of the human soul—pay practically no attention to the method of delivery of their message. They rise upon their toes and fold their fingers, and scream till they are purple in the vain effort to be impressive."

To obtain the best effect, one must study the art of control over both body and voice. This demands laborious and painstaking effort. The time to begin is in childhood, at the "awkward age" when thought processes are still plastic and have not reached the stubborn and sometimes almost hopeless automatic stage,—a period of life in which it is difficult either to learn or unlearn.

Voice is produced, not by the throat alone as is commonly inferred, but by every part of the body.

*Miss Theodora Irvine of Carnegie Hall, N. Y. City.

The nose, accessory sinuses of resonators, pharynx, buccal cavity, teeth, lips, tongue, larynx, lungs, bony thorax, diaphragm, thoracic and abdominal muscles, and, of course, above all the central nervous system take part in this complex vocal mechanism. The ears give one an idea of quality, timbre, pitch, loudness, etc. Touch enables one to "feel a tone," as the expression is. The muscular sense is capable of telling whether individual muscle groups and antagonists are working properly.

As for the throat itself, correct function of the vocal cords calls for the purest and best tone with the smallest output of effort consistent with artistic speaking and singing. This is a fundamental law and the one which is most frequently violated. The campaign speaker is always confounding big, burly voice with strong argument, and the ambitious singer is always mistaking a big, brawling tone for genuine art. Accuracy of method should be the first consideration.

Phonasthenia is a condition which affects nearly all ages and both sexes. Voices of high pitch are especially susceptible, because not infrequently they have poor carrying power, and the user is always making an effort to be heard distinctly by all. Teachers, preachers, stump speakers, vendors, telephone operators, and singers are most frequently affected.

Certain physical causes associated with diseased conditions engender disturbances which prevent the muscles concerned with voice production from reacting properly to normal impulses. Thus anemia and chlorosis, through insufficient nourishment of the muscles and improper removal of waste, are not

uncommon causes. In such cases, where voice gymnastics and other therapy fail, arsenic, iron, and strychnine may work a cure.

The edges of the vocal cords are extremely sensitive to slight influences. For example, pregnancy, a physiological condition, may change the quality and carrying power of the voice very markedly. Menstruation also affects some women in like manner. Convalescence from typhoid and influenza frequently show marked vocal change which are for the most part, however, merely temporary. Chronic diseases are a potent cause of voice fatigue; chronic tonsillitis with concrement formation is especially important. Nasal growths and deformities, purulent discharges, and chronic hypersecretion are also frequently responsible agencies.

Beside the above mentioned, we have also to reckon with causative factors which demand a greater amount of strength for the production of a tone than should be employed. False teaching and improper vocal efforts are common factors. Imhofer says that two-thirds of all cases of phonasthenia in singers are due to bad schooling. Flatau believes that eighty per cent of young singers are affected with phonasthenia by the end of their third year of study. There seems to be no one error of method, but every rule which violates the law demanding the use of the smallest amount of effort for the maximum of effect, tends to phonasthenia.

The symptoms of phonasthenia are definite and certain. There is sudden and severe hoarseness or huskiness, tendency to clear the throat constantly, discomfort in the sides of the neck, and discomfort on swallowing. There is no sign of an active inflam-

matory process, although redness is pronounced if the condition comes on acutely, as in public speaking. The voice is weak, unsteady, tends to break in certain spots, and to slide off the pitch into a lower key.

In every case of phonasthenia, one should go carefully into the history. Usually there have been from two to twenty singing teachers, each of whom has told the pupil that his (the pupil's) method was all wrong, and must be utterly changed. This produces so much confusion and uncertainty that the pupil ultimately confesses to lack of knowledge of the very fundamentals of voice production.

Many of these patients have gone through a process of having the voice "screwed up." A baritone has been changed into a tenor, or a contralto into a soprano. In some borderline cases it is almost impossible to say which type one is dealing with, whether, for instance, a voice should be trained as a baritone or a tenor. Moreover, certain peculiar changes take place quite unexpectedly at times. Thus Jean de Reszke began his career as a baritone, but his voice changed naturally to an exceedingly remarkable tenor. Singing out of one's range has ruined many a good voice. Some music, as written, is specially difficult even for a well schooled voice. For example, the character, Ortrud in Lohengrin, makes very severe demands upon a contralto.

Breathing, while essentially simple, is a great bugaboo to many singers. Instead of being an involuntary, automatic act, it is forced and voluntary. The fault is chiefly in improper expiration. A singer will fill the lungs with air when about to take a high note and strive to force the

entire volume through the narrow chink of the glottis. The column of air is too rapidly discharged. Graphically speaking, the abdominal respiratory curve is too sharp. It should be wide and show a gradual approach toward a straight line effect.

The much-discussed *coup de glotte,* stroke of the glottis, is considered by some authorities to be a primal cause of phonasthenia. One must distinguish between this method of attack and that used by coloraturas in doing agility exercises, for the latter is physiological, but the former demands that the vocal cords be pressed tightly together in making the attack.

Tongue interference is also a common cause of voice fatigue. Here the tongue is arched upward and backward, pressing against the epiglottis, and dampening the desired effect to a marked degree. Usually, the more one draws a pupil's attention to this matter, the more unruly does the tongue become. Holding the tongue down with a pencil or spatula does no good. The condition is of cerebral origin and must be corrected from that standpoint.

Now and then some teacher boasts of a special trick or device for overcoming all the singer's difficulties, which he has elaborated into a "method" and promulgated as a law. As already emphasized, there is only one way to sing and that is the correct way, viz., by using a minimum amount of effort to produce a maximum artistic vocal effect. Singing is a great art which does not readily yield to a series of rules and regulations. Because it is such a simple natural process, excessive thinking about how it is done has made it one of the most

difficult arts to acquire. It is first of all a gift—a gift which is not widely distributed among mankind in spite of the fact that nearly every one can sing a little. A high artistic standard has been set by the world's great singers which is impossible of attainment by the great mass of mankind. It is a gift which manifests itself in infancy, and hard work is only a very subordinate qualification in attaining great place in the world of song.

For years the battle has been waged between the so-called open technic of the Italian school and the closed technic which is more distinctly French. This debate is of some importance to physicians, because it has a direct bearing on phonasthenia.

Singing with wide open mouth, enormous lung volume, and violent movements of the body, lays the foundation for an early onset of phonasthenia. It is especially bad for contralto, baritone, and bass voices where "big tone" is considered of prime importance. On the other hand, the excessively "covered" type of production, projecting lips, cramped smile, and a too frequent use of pianissimo wearies the listener and robs the voice of that dash and brilliancy so essential to certain type of song.

Anything which disturbs the automatic singing act, every adventitious element in the tone-producing and tone-resonating apparatus, violates the fundamental principle that the least exertion should secure the greatest effect, and tends to phonasthenia. The voice must be handled as an individual problem. The psychic element, mental poise and suggestion are all important. It is very necessary for everyone who essays to deal with singers to cultivate

an attentive ear, refined taste, and a habit of reflection. Only in this way can critical judgment be educated to interpret what is wrong with the voice. Imhofer has put the matter tersely and correctly: "Whoever busies himself with the treatment of voice defects must be a laryngologist, a musician, and a diplomat all in one."

The treatment of voice fatigue, both in speakers and singers, is fraught with difficulty, chiefly because the thing mostly to be desired, viz., rest, is felt to be impossible. The patient wishes to know how he can go on with his work and make a fair showing in spite of his disability. But it is of no use for a physician to treat such a case while the causative agents persist. The physician must recognize all causes for the vocal breakdown, both direct and contributory, and deal with them accordingly.

With singers a system of prevention should be worked out. This will astonish most persons, for such a thing as hygiene of the voice is practically unknown. The teacher must be invited to send his pupils for early examination not only of the nose and throat, but of the general physical condition as well. This should be done after the first interview between teacher and pupil before lessons are begun. If in the general examination there are extreme nervousness and irritability, poorly nourished body, chlorosis, anemia or debilitating disease, the pupil should be advised not to undertake so difficult and prolonged a task as voice culture. If he does, disappointment and even worse are inevitable.

The "feeling" and significance of early voice fatigue should be explained. The first lessons

should last not longer than twenty minutes, consisting of vocalization for five minutes, followed by a rest for five minutes. The pupil should not go home at the end of the first lesson to strain his voice by attempting arias from grand opera. He must be taught how delicate the vocal mechanism is, and that a long, bright career is rather to be desired than a short brilliant one. On his own behalf, the physician should realize the utter futility of spraying, painting, burning, the use of pastilles, etc., save when called for in acute infections and chronic productive processes.

When treatment is decided upon, the full and earnest co-operation of the patient must be insisted upon. Discipline must be rigid, even to the minute of the hour for appointment. First of all a voice analysis with piano should be made with notations of all defects. Then the "silence treatment" must be carried out rigorously, remembering, however, that this will not cure voice fatigue, for the symptoms will disappear only to return when the voice is used.

The patient is better off away from people who make social demands upon him. In certain cases vocal gymnastics can be begun right away, but the general body condition must be good, especially the condition of the nervous system.

Local causes such as growths, etc., should be removed when analysis shows that they are of great importance, but one must remember that these patients are often suffering from local over-treatment, or rather misdirected treatment. A specific case of this came to my attention in which a

phonasthenic had been so much operated upon and cauterized that he became neurasthenic as well, so that he could not even take vocal gymnastics.

Nasal insufficiency, if marked, leads to forcing and should be corrected, but preferably by a conservative method. The nasal fossae must be equalized in size and function.

Tonsils in singers must be studied before removal is advised. It may be wisest to do a tonsillotomy, partial removal, rather than a tonsillectomy, total removal, or even to treat the crypts conservatively. Caustic agencies are to be avoided in phonasthenia —they do little good unless there is much hypersecretion. Warm applications are useful for pains in the throat. Menthol may be applied to the mucous membrane for cooling, analgesic effect. Flatau advised cupping each side of the larynx for from fifteen to forty-five minutes. After a few hours, this is followed by moderate swelling of the vocal cords. In a few days the cords became paler, less swollen, and of greater mobility. This method often does well with speakers. A spray of ice water is a welcome measure with some persons.

Voice fatigue in speakers is often due to the fact that the voice is pitched too high, i.e., above its normal range. According to Spiess, the most favorable tone register for speakers is about three tones below the middle of the voice range. As soon as possible the patient should be taught, by a teacher of expression, how to secure and maintain a proper relationship between the natural voice and the height necessary to declamatory demands.

The speech must be slow, fairly light, with good

lip and tongue action. The voice should be directed forward against the upper teeth and hard palate, and increased and diminished in a monotone. Certain syllabic exercises such as the nō, nā, nū, ni, nä, and cō, rō, mō varieties, sung with moderate strength in middle voice, are helpful. During these exercises special attention must be paid to the breathing. It is, of course, undesirable that the physician undertake this work personally, but he should insist that it be carried out with a good teacher.

Imhofer and others have worked out a helpful but rather complicated system of electrical tests of phonasthenia, which need not be taken up here. Such tests are of value chiefly in the resistant and long standing types of the affection.

When can we safely say that we have cured a phonasthenia? This is sometimes a difficult matter to determine, but if there are no subjective disturbances, if the voice is of good clear quality and keeps to the pitch—in short, if there are no disturbances of intonation, we may safely dismiss the case. A useful test is made by applying an electrical current to the larynx during vocalization on a single note. If the larynx is normal, the tone should be elevated because of increased muscular action.

Quite marked phonasthenic symptoms may disappear under proper attack, correct breathing, and accurate tone placing.

The entire problem of voice fatigue is worthy of intensive study at the hands of every laryngologist. A physician's advice and help are badly

needed by the singing teacher in treating this condition, but the doctor in his turn can learn very much of interest and practical value from the vocalist. In the meantime, the singer-patient is benefited by this joint effort of his mentors.

CHAPTER VIII

VOICE TEACHER AND VOICE PHYSICIAN

Next to thorough analysis of one's qualifications, physical, mental and vocal, comes the problem of securing the services of a satisfactory singing teacher. All singers will, I think, accede to the statement that this is one of the most difficult questions to settle. Very few great artists have started with one teacher and continued with him throughout the long years of preparation. There are many reasons for this, chief of which is that one may go a long way with her teacher, only to find that the personality or the "method" is unsuited to her special needs.

When I first began to pay attention to the vocal problem and came into closer contact with teachers of singing, I was at a loss to understand the basis of antagonism which apparently exists in some quarters between teacher and laryngologist. Instead of a spirit of friendly co-operation, there seemed to be a watchful and jealous eye under which the pupil was obliged to exist. Teachers were blaming nose and throat specialists for performing unnecessary operations, ruining voices, giving singing lessons, undermining the influence of the teacher over his pupil and raising havoc generally. The laryngologist on his side indulged in disparaging remarks and showed other evidence of disregard for

the members of a profession closely allied to rhinolaryngology. In each and every case I found that the accusers had no intimate knowledge of each other's work, of the problems they were trying to solve, or of the difficulties to be overcome. It was manifest that few physicians had ever visited a vocal studio to watch the actual work of instruction, and that the teacher was equally uninformed of the specialist's viewpoint in the management of throat and nose conditions.

One thing, however, is certain; namely, that both have at heart one common aim, one definite purpose, the welfare of the pupil. Many a singing teacher devotes hours and hours in an attempt to build up a voice which to the casual observer seems to offer little hope of promise, and this without one cent of reward. Unfortunately, too, such effort sometimes brings forth no sense of gratitude in the pupil. On the contrary, one may see such utter lack of appreciation as to shake his faith in human nature. But the teacher, like the physician, takes it all as "part of the game" and plods along doing his stint of work as best he can from day to day. When we think of the long apprenticeship, the hard struggle for recognition, the relatively short career, and the rapid vocal decline, we must in all justice condone much in singers that would be quite inexcusable in others.

The burning question is, after all: How long is the voice going to last? And again: How can we help to lengthen the span of vocal life? To begin with we must consider each individual separately; for his problem may be quite different from that of his associate or friend. Any voice which is going

to amount to anything must be built up on a solid mental and physical basis. A beautiful tone quality is of little ultimate value if there are no brains to top it off with. Or, given both of these in good measure, one can expect little if the physical organism, the general health, is vitally deficient. *Mens sana in corpore sano* is just as important to the singer as to any other person; in many respects it is of the utmost significance. To excel in song probably requires more natural talent, more careful

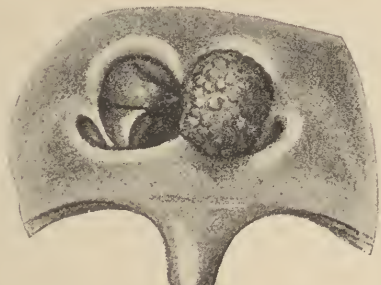


Fig. 10.—View of the post-nasal space (naso-pharynx) showing a strawberry-like enlargement of the posterior tip of the inferior turbinate which completely obstructs the left nostril.

adjustment of essentials than any other art. Seriousness of purpose and hard work, while important, are less so than talent or intelligence and physical fitness. We cannot create talent or intelligence, but we can correct many physical defects and can mold thought-processes. First of all, the body as a whole must be made an efficient instrument of the will. The physical organism must be put right. It is disappointing in the extreme to see the pupil struggle along for two or three years under the burden of

nasal insufficiency, obstructive adenoids, or chronic disease of the tonsils, then suddenly become aware of the reason for lack of progress. All this for want of a thorough and careful physical examination at the outset.

Every teacher and physician should know a great deal more than he is obliged to make use of in his daily work. His fountain of knowledge should be so inexhaustible that no pupil or patient can pump him dry. This applies, of course, to those things which are known of a certainty, not to the merely speculative or quixotic. There must be an increasing desire to explore the unknown, and to push back the veil of ignorance a little further, so that the physical horizon of the chosen field shall become a vanishing point. It is true that all roads lead to Rome, but there is certainly one which is wider, smoother, shorter and shadier than all the others. It is this which vocalists as a whole are seeking in the efforts now making for "standardization." Whether it can be done or not is an undecided question, but there is no harm in striving for it. Nothing but good can come out of discussions of the subject, even if the discussions are sometimes attended with more heat than light. The light is needed, to be sure, but the heat is a purifier and a refiner of ideas. There must be, after all, certain guiding principles, which are the basis of all successful results—the differences are those of degree only and not of fundamental fact.

Thousands of young men and women begin vocal work in the fall of each year simply to have something to do, or because some friend is taking lessons, or to appease the family pride. Under such condi-

tions it does not seem to make much difference who undertakes this training task. Very often a pupil is influenced to go to a certain teacher because of reasons which should carry no weight whatever. One of these is to help some individual who has been unfortunate, to earn a living. That is, perhaps, the poorest reason of all, and is almost sure to bring about both regret and repentance. Time, money and effort may thus be wasted, and in the end the pupil gives up in disgust.

There are many honest, conscientious, hard-working, competent teachers who give excellent instruction. Unfortunately, there are a few in every walk of life who have no end or aim in view save the almighty dollar. These are sometimes the highest in price,—they are surely the most expensive in the long run. But, all in all, there is just as much loyalty to a definite ethical standard, just as much self-sacrifice and nobility of purpose among singing teachers as among any other class of professional men. I have known teachers to spend months and years in training a naturally beautiful voice, only to have the entire effort wasted through some foolish whim or caprice or lack of stamina in the pupil,—and all this without hope of reward.

Some people have the idea that a successful instrumentalist, especially a pianist, knows a great deal about training the voice. This is not necessarily true at all; in fact, vocal teachers and instrumentalists are seldom found in happy combination in the same person. If one *must* take an instrumentalist, let it be rather a violinist; for the latter comes nearer to an understanding of what is meant by fine modulations in tone work than any other

performer. Of all instruments, as has often been said, the violin comes nearer to approximating voice in its effect on the ear than any other instrument.

It is important to determine whether the teacher has been a singer who has failed in his work. There are some broken-down singers who have come to their unhappy state through bad vocal technic. Needless to say, it is little short of tragic to entrust a fresh young voice to such guidance, however honest and conscientious the master may be. Of course, he may have failed because of ill health or some like misfortune, which reasons certainly should not militate against him. Every teacher should be able to illustrate his points in a manner which it would be *no crime* to imitate; for imitation plays no small part in voice cultivation.

If the master insists on the forte use of the voice during the entire lesson, if at the end of the session there is always a strained, tired feeling in the throat, weakness or huskiness or tickling, and cough, then, whoever your teacher is, whatever his standing in the community, he is not for you. As Mackenzie so well says: "The most skillful and experienced teacher may err, but Nature is never wrong, and her laws have the sanction of an unfailing Nemesis."

Madam Seiler lays great stress on the importance of female voices being trained by women and male by men. As vocal art is so highly imitative, there may be some truth in this view. According to her, F. Wieck always instructed women with the help of trained female voices. "The suggestion may seem puerile to those who teach solely by the light of the laryngoscopic lamp, and who, like the fencing-master in the comedy, think more of the way in

which a thing is done than of the result, but if the teacher uses his own voice as an example, it seems just as likely that a woman trained entirely by a male teacher will sing like a man, i. e., with predominance of the chest register, as that if taught writing by a man she will write like one."

It is insufficient evidence of teaching ability if a master has produced *only one* successful pupil who is making a fine showing in vocal art. This may be simply an accident, some voices being naturally so well placed as to defy destruction by incompetent meddling. The only practical test is to visit the teacher's studio, watch his method, hear him sing, and study his pupils. A knowledge of his past musical career is often of some additional value.

The Italian masters spared no pains to "unite the registers," dovetailing the one into the other, and, as it were, planing the surface of sound till the voice was smooth and uniform throughout the entire compass, and no "break" or difference of timbre could be detected.

"In the proper management of the registers lies the whole secret of fine singing," says Dr. Mackenzie, "and in nothing is the skill of the master more clearly seen than in the success with which he imparts this accomplishment to his pupils. It is on this point, too, that vocal training most requires to be controlled by the physician, not, of course, that a medical man should presume to dictate to the singing master what should be done. All I claim for science is a right to veto against methods which are physically hurtful. If in the attempt to develop the voice, a register—i. e., a particular mode of production—is forced beyond its natural limits in a

given individual, the result is likely to be serious injury to the vocal organs, in precisely the same way as when the strength of any other part of the body is overstrained. It is in order to guard against evil of this kind that I have laid such stress on the necessity of dealing with every voice according to its idiosyncrasy. If a teacher mistakes his own ideas as to the registers for ultimate facts of nature, and insists on making every larynx rigidly adapt itself to his *a priori* conceptions, he cannot fail to work much mischief. He may have some brilliant successes, but his record of failures will certainly be a heavy one."

Far be it from me to belittle the praiseworthy efforts of vocal teachers. As a class, they are of an exceedingly high order of intelligence, and intensely in earnest. Unfortunately, however, their work is not standardized and they are severe critics of each other. It is to be hoped that in time it will be compulsory for every teacher to have a license from the State Board of Regents, just as the doctor and lawyer must now have. Then the incompetents will be reduced to a minimum, and the truly worthy will be more highly thought of than at present, when there is such confusion and internal dissension.

Recently in New York City an effort was made by M. Philip Berolzheimer and other friends of music to have an ordinance passed with would call for the licensing of all vocal teachers. A hearing was held in the office of Mayor Hylan, to which the best-known and most influential teachers in the city came in large numbers, and, almost to a man, brought forth arguments against any such procedure, so that in the end nothing was done about

it. If any reform is to come at all, it should be from within; that is, the right-minded teachers must in some way drive out the quacks. It is for the teachers who have earned a respected place among their confrères to band together for the common good and try, if they can, to frame such legislation as will put vocal teaching on a plane with other great and worthy professions.

In June, 1915, at the Convention of the New York State Music Teachers' Association, held in New York City, an honest and praiseworthy attempt to begin standardization was set down in a series of eighteen postulates formulated by "the Committee on Standards" and discussed at length by the entire assembly. These statements of fact for the guidance and instruction of all interested in the singing voice were entitled, "Fundamental Principles of Breathing," and are to be found in Appendix I of this book. Another set of "Fundamental Principles of Voice Production" were submitted for discussion by the National Association of Teachers of Singing at the same meeting and approved, but apparently nothing has come of either of these efforts, and yet they are almost axiomatic, and should serve as a basis for standardization. The reader will find this second set of *Principles* in Appendix II.

Although the legitimate fields of laryngologist and vocal teacher are distinct and separate, they have so much in common that co-operation should prove of great advantage in the training of singers.

The physician may be, and usually is, incompetent to decide how a given note is to be delivered, or a particular vocal effect produced, but he alone can determine whether the vocal cords are strained

or otherwise damaged thereby. The laryngologist can see, with the mirror, any congestion induced by vocal strain and can testify to the prompt return to normal, which occurs when the method of production is changed.

According to most authorities, training should always begin on the middle notes, and until the *messa di voce* has been perfected on these, no effort should be made to extend the range. Many teachers train the voice upwards from the middle; but there is some logic in favor of training from the middle both upwards and downwards.

Together with the *messa di voce,* the pupil should practise portamento; that is to say, the carrying of the voice from one note to another instead of jumping.

But at this point I must again hark back to my old theme, even at the expense of wearying the reader, namely: Before a pupil begins actual work, he should be thoroughly tried out and examined by a laryngologist who knows something of the singing problem. The nose, throat and ears should be tested by every known method, and a definite idea should be obtained also of the general bodily health. It is helpful to know the range and compass of the voice, and to determine any serious faults of tone production which are not due to purely physical causes. For this, one may try out a voice at the piano and make careful notes of what is found; then, at a later date, this can be done again for purpose of comparison. Any recommendation as to vocal exercises should be communicated to the teacher direct and not to the pupil, since it is the teacher who is immediately responsible for vocal growth and prog-

ress. The laryngologist should avoid falling into the error of always finding some physical cause for every disturbance of which the singer complains. Very often such symptoms are the result of something the singer does in practice at home which is not found out at once by the teacher. There are, too, some voices which do not develop satisfactorily, where neither the teacher nor the physician can find any discoverable cause for the defect. Secretory changes in the mucous membrane are of especial importance and are frequently overlooked. There may be an abundant, sticky secretion which dries and forms crusts in the nose, or the mucous membrane may be very dry from glandular inactivity,—a condition which interferes greatly with the singer's finer work, especially the soft tones.

It is not my purpose to go into these matters exhaustively, but merely to point out a common ground upon which the rhinologist and vocal teachers can think, act and work together for the furtherance of perfection in the science and art of song.

CHAPTER IX

VOCAL HYGIENE

Hygiene of the voice is, of course, indissolubly associated with general bodily hygiene, but there are some special considerations which the singer, above all other persons, ought to have constantly in mind.

First of all, it is of especial importance that the upper airways be kept in the best possible condition. In a previous paragraph the importance of an examination by a competent nose and throat specialist early in the pupil period has been emphasized. It is hopeless to expect much from a nose in which the partition is so deviated as to obstruct one side, or where there is a chronic discharge. In such a case resonance is of poor quality, mouth breathing, especially at night, is always present, and there is a constant series of colds and sore throats.

One is often asked about nasal douching. There is still a divergence of opinion among specialists in this matter, but the majority do not look upon it with favor owing chiefly to the danger of infecting the ears. The nose is always filled with foreign matter, dust, germs, etc.: therefore, while douching, fluid may carry this foreign matter, especially bacteria and muco-pus so often seen in the nose, right up into the Eustachian tube and the middle ear.

After douching, there is a great tendency to blow the nose in order to clear out the excess of fluid, but when the nose is blown at all forcibly, there is great danger of propelling this foreign matter into the middle ear and producing an abscess which may go on even to so serious an affair as mastoiditis.

A nasal douche should not be used as a routine procedure. This is definite. However, if there is much free discharge or dry discharge (crusts), one may use any of the good alkaline preparations now on the market, taking especial care not to blow the nose forcibly afterwards. So-called normal saline, or physiologic salt solution is, perhaps, as helpful as anything which is sold over the counter. This is made by putting a level teaspoonful of ordinary table salt (not shaker salt) into a pint of water at body temperature, roughly about 100° F. Where there is much discharge one should make up a quart, using two teaspoonfuls of salt. The ordinary household douche bag is excellent for this purpose. It can be fitted with a glass tip—a medicine dropper of fairly large calibre is excellent for the purpose—and hung about a foot and a half above the head. If there is much discharge as in acute sinus infection, suction and irrigation by means of the Nichols nasal syphon will cleanse the nose better than any other method, but it should never be used save upon the advice of a physician.

Following douching, only very slight snuffing should be allowed, placing one finger against a nostril so that only one side of the nose at a time will be submitted to air pressure. It is always safer to use an atomizer to open the nose, but where

the discharge is of a sticky character, this is not very effective.

In salt water douching, it is important that not too much salt be used. Professor Imhofer, of Prague, reports a case of total loss of smell (anosmia) from frequent use of too salty a solution. In any case the water should be at body temperature. If too hot it will congest the interior of the nose, producing a reactionary swelling, or even destroy the surface of the mucous membrane lining the nose. If too cold, it may cause much irritation and aggravate the symptoms already present.

Gargling is a good way to cleanse the back part of the mouth and throat, but there are many persons who never learn to do it well. The teeth and mouth should be cared for after each meal.

Although breathing is the one great unconscious act in the human economy, rivalled only by the activity of the heart and circulatory apparatus, it is surprising how few people get the most out of their lung capacity. Most of us use about one-fourth or one-half the amount of lung tissue with which kind Nature provided us. This has been abundantly proven over and over again. The breath must be taken noiselessly. Nothing can be more distressing to an audience than the gasps which often break a flood of vocal melody like the creaking of the bellows of an organ. The air should be drawn in through the nose; the mouth being used only as a subsidiary passage, when absolutely necessary. Lamperti used to say that the vocalist should take his breath and retain it like the swimmer, and there is no doubt that those who excel in

this art adopt very similar methods as regards respiration.

It is a curious fact that men breathe differently from women, the former using the abdominal method—that is, pushing down the diaphragm—and the latter doing most of the work with their upper ribs.

Every physician finds patients with great areas of lung into which very little air enters. Knowing this, one does not need to wonder at flat chests and poor general physical development. The elasticity of fully expanded lungs gives a sense of grace and poise which is truly remarkable. The writer recently saw an excellent new system of dramatic interpretation based entirely upon a correct breathing outline. It is surprising how few teachers make a systematic effort to train pupils how to breathe—that is, to teach breathing as an art without vocalization. This matter is worthy of intensive study. There must be good development of the abdominal and chest muscles. This can be taught by any physical educationist in a short time, and needs then only to be practiced at home. Various forms of exercisers, such as the Whitely apparatus, can be used with great advantage in one's room before an open window. The breathing capacity must be increased by properly directed exercises. I strongly recommend all those who wish to excel as singers to undergo a regular course of gymnastics if possible, in a gymnasium where suitable apparatus exists. It must not be forgotten that exercise of the whole body brings the respiratory muscles into play, and if systematically pursued, greatly strengthens them. Most of the text-books on the training of the voice contain rules for respiratory gymnastics, and an ex-

cellent series of exercises is contained in Guttmann's Gymnastics of the Voice (Edgar S. Werner: New York). Walking, fencing, swimming, dumb-bell practice, are excellent means of improving the "wind" provided they are not pushed to the point of actual fatigue.

The lungs must be emptied thoroughly, but without straining, and the pupil must strive to gain such control over the breath that he can mould the issuing stream of air to any shape, and regulate its volume and force so that no part of it is allowed to escape uselessly.

For the past year I have been sending patients to physical instructors of repute for this work and the results have been surprising. A contralto with a truly remarkable range and great versatility used to be so fatigued after the opera that she felt quite ill during the entire day following. She was small and thin, and exhibited very inadequate muscular power, especially of the abdominal region. A woman gymnast of well-deserved recognition took her in hand and in about eight months produced a truly excellent development which gave the patient grace, poise and an invaluable sense of assurance.

Proper clothing for the body is an efficient means of protecting the nose and throat against the many ills to which these organs are subject. Too much clothing is as bad as too little. The body surface should be protected, not coddled. Cotton is not as good as either silk or wool for undergarments, and none of these in my experience is so thoroughly satisfactory as linen mesh. This latter readily admits ingress of air and egrees of body vapors so that a kind of "skin breathing" can go on continu-

ally. The waste from the eliminating glands in the skin is readily taken up by linen mesh and the body surface does not chill so readily.

Tight collars and tighter corsets are an abomination. How they constrict the blood vessels and hinder muscular action need scarcely be mentioned. Public singers require no instruction on this point. They soon learn to adjust these articles of apparel so that they cease to cause inconvenience and interference.

Open neck waists may be worn, if, upon going out, the neck is not swathed in furs. If close-fitting furs are worn the change is too great and the skin is made sensitive to sudden variations. A cold sponge bath for the neck and chest upon rising is a good protective against cold. It is also good practise to hold the cold sponge against the nape of the neck, squeeze it out and thus enjoy a kind of spinal douche. All this should, of course, be followed by brisk rubbing to encourage "gymnastics of the skin vessels."

The condition of stomach and bowels is of especial importance. Indigestion is a foe to good vocalization, especially if there is an excess of stomach acid (hyperacidity). Free daily evacuations must be maintained. The food should not be too spicy or too hot when served. Much harm is likely to follow over-eating.

In the matter of food, every sensible person is the best counsellor for himself. As Bacon most wisely says: "A man's own observation what he finds good of, and what he finds hurt of, is the best physic to preserve health." It would be easy to frame elaborate schemes of diet in which the exact

weight of meat and the precise quantity of vegetables allowable should be laid down with the accuracy of a physician's prescription, but such solemn trifling can only interest the professed valetudinarian. Let a man eat to the satisfaction of his natural appetite what his palate craves and his stomach does not kick against; an adult has, as a rule, been taught what his ailment should be by that most practical physician, experience. Let him take his meals at regular intervals and chew his food properly and he may laugh at the highly rarefied menus dictated by the framers of dietetic decalogues.

A good meal should follow any prolonged vocal effort, but hot or pungent things, which as already said, are always hurtful, must be particularly avoided under such circumstances for the reason just given. In fact, all the precautions which I have enjoined in various parts of this work against atmospheric or other irritants (close rooms, tobacco smoke, etc.) are doubly necessary when the throat is congested and fatigued after a great effort.

Wine may be used in moderation if no catarrh is present and if the stomach bears it well. In spite of popular opinion most dark beers, especially those of foreign brew, contain less alcohol than the lighter variety. No benefit is to be derived from cognac, punch, high balls, etc. In fact, the less indulgence in all spirituous liquors the better.

Certain social or environmental considerations are responsible for many voice troubles. Traveling in railway trains in badly ventilated cars, the air laden with black soot, cinders and dust, is a poor preparation for a stage performance. Many, if not most, theatres have no provision for ventilation,

save doors and windows. The stage is often drafty and the thinly clad artist is exposed to the blasts of air which chill the body surface and provide conditions conducive to "colds." Dry sweeping in some houses is indulged in an hour or so before the curtain rises. The windows and doors are then shut and the steam heat (if it is winter) does the rest. Is it any wonder that singers complain of dry throat and coughs? Add to this, the powder that is shaken about in a stuffy dressing room and you will produce clinical material in short order.

The importance of rest at certain physiologic periods cannot be overestimated. One veteran teacher of my acquaintance, residing in Chicago, who has given his finest efforts to the successful furtherance of the art of song, makes it a point not to allow his girl patients to sing at all at certain intervals. Speaking, of course, need not be interdicted; nevertheless, care should be taken not to try to drown out a noise or to strain the throat in heated debate. It is a curious fact that the voice in anger is always elevated.

Vacation time should be spent in a fairly high dry climate, where the social demands are not too great. The pine woods are in many respects ideal, other things being equal, but the singer must exercise the while a judicious control over his activities. Ocean air while excellent for some persons, causes catarrhal symptoms and stuffiness in others which do not compensate for the "delights" of the seashore.

Of outdoor sports, the best for the singer is golfing or tennis. Swimming is a menace to the ears, nose and throat. Bicycling is fatiguing and develops only the lower extremities, while the chest

and trunk muscles are largely neglected. Automobiling is not "exercise" by any stretch of the imagination. Great currents of air laden with dust are swept into the vocal airways and the result is a dry throat, huskiness and hoarseness.

It should be remembered that the final test of voice efficiency—the result so to speak—is in reality an answer to the question, "How long should a voice endure?" The life of a voice is much more important than the plaudits of the crowd. Incorrect method, faulty voice placement, in a word, poor technic may not prevent the singer from winning praise from the uninitiated and unthinking for a time, but finally there will come a break, a loss of efficiency, a refusal of the delicate mechanism to obey the mandates of the master. This marks, in many cases, the beginning of the end. The voice is prematurely old, and one's active career is ended. If a singer has lived carefully and has had no unfortunate accident or illness, the voice should last up to the period of well-defined senile changes. This life span is somewhat shortened in the average individual who is careless about vocal hygiene. In women, fifty to fifty-five years of age marks the limit of public singing efficiency; while in men, this limit is reached at about sixty. Anyone who has been able to earn a living in a public career for such a length of years may well have reason to be proud of his achievement, for it means that he has made the most of his gift and has not subjected it to wanton abuse. Youth is prone to overestimate its abilities and to force an issue where a more rational method of procedure would be in order. Advisers who are older and presumably wiser should

endeavor to keep a check on too prodigal usage of the voice in those consigned to their care, and by precept and example should show that moderation in all things is the first essential to a long and happy life.

PART II

CHAPTER X

EXAMINATION AND DIAGNOSIS

This chapter is written especially for physicians and will have little appeal to the patient. In fact, the patient may be much better off for not reading it at all. The physician is the mentor. He is the one responsible for diagnosis and relief of the symptoms which he is called upon to treat; and, therefore, his work is peculiarly his own, and his point of view cannot be, or at least seldom is, understood by the one consulting him.

It may seem unconventional to "lecture" professional brethren on the art of managing patients, but this is a subject which is seldom or never touched upon in medical school, and has to be found out by experience, which is long and sometimes costly. In fact, there are plenty of us, no doubt, who never profit by experience at all; therefore it may be said that we never have learned our art.

Singers are different in many ways from the ordinary patients who visit a doctor's office. They have a psychology which is all their own. They are usually frank, intelligent, inclined to be emotional, quite easily "upset," and unduly influenced by matters which may seem trivial to others. If they are for you, they will be the kind of friends who would

die for you at a moment's notice; and if they are not for you, the quicker you part company with them the better. All in all, they are delightful people to know and to work with, and are extremely appreciative of any good you may do them. It will do no harm to humor them a little, and it will do you no harm if they sometimes embarrass you with well-meant but rather exaggerated compliments or even terms of endearment. As a famous philosopher once said: "Everything goes." With singers, everything goes well, or it does not go at all.

Let me assume that you, a physician, who essays to diagnose and treat vocal difficulties in singers, are sitting at your desk with the patient before you. This is a great moment in the life of the patient, although it may mean little or nothing to you. All her future hope is perhaps centered in you because someone has been good enough to say that you are the one Moses who can deliver the people of Israel from their difficulties and dangers. That is probably not strictly true, but you must endeavor to live up to your reputation. It is quite likely that you are not the first physician who has been consulted with respect to the present disability, and it is also likely that you will not be the last, although it should be your effort to see to it that *you are the last* and never the least. This singer has tried many sources of relief, including osteopathy, chiropracty and Christian Science. When she tells you that any one of these was "simply wonderful" and gave her a "world of relief," do not be offended or take it too seriously; for she knows and you know in your heart of hearts that were this strictly true the present interview would not be held. The chances are

she is not saying this to annoy you, but because she may think that had she persisted in that other kind of treatment she would have been cured, and has a half-hearted regret deep seated in her soul. Of course, the patient may be cynical, even doubtful, of your ability. She may have come reluctantly at the request of some old patient of yours, or some "friend" has made her life so miserable that she has some to you in self-defense.

After you have talked with her for a time, you may decide that conclusions she has drawn with respect to her efforts to get well are not entirely unjustified. Every human being has a certain measure of faith and also a certain measure of doubt. The transition from one to the other may be quick, and, unfortunately, it may also be permanent. It is your job to dispel the doubt and increase the faith and that may be the hardest thing you have to do. Personally, I always feel that the patient's fear of visiting me, or of having something done, or of undergoing an examination, is the hardest thing that I have had to combat. I sometimes tell myself that I am the worst fear specialist in the world, because I sometimes despair of ever overcoming the peculiar objections which some people feel against any kind of interference on the part of those who would willingly help them. But one must disregard all sham and hypocrisy and encourage a happy spirit of co-operation. If a patient cannot be inspired with faith in you, and if you cannot become deeply and thoroughly interested in the problem before you, then neither of you can help the other, and the probable outcome of your acquaintance will scarcely amount to friendship. Relief or cure of

a condition or disability, whether functional or organic, will depend on mutual understanding and co-operation. We should aim at all times to put the patient at ease, to cultivate a kind, sympathetic manner and avoid brusqueness; especially should we not assume an air of superiority, of cocksureness and smartness. It is difficult to see in the nature of things how anyone can hold such an attitude for any length of time, considering the pitfalls and errors into which every one of us is prone to fall. One should always knock at the door of humility and seek admission into its sacred portals.

If you are unfortunate enough to frighten the patient, she will never give you her confidence or tell you important symptoms and facts in her history, and this alone may lead to misinterpretation and failure. One should never try "to make a hit" with the patient, but should resolve earnestly and thoroughly to diagnose and heal the disease or disability so that everyone concerned will be pleased with the result. Remember, everything must be subjugated to result, to a successful issue. If you undertake to handle a case at all, your time consumed, your inconvenience, your own distressing aches and pains (for sometimes a doctor is suffering physically or mentally while treating a patient much more than the patient himself), your fee, and all else, are secondary.

It is a nice courtesy to have a pleasing attendant on service in the waiting room. She should be a bright, attractive, young girl of good personality, who knows how to ingratiate herself with the patients and find out from them anything that it is desirable for the doctor to know, without allowing

them to find out anything about herself or the doctor, which patients usually have no business to find out. It is in human nature to pump the office nurse or attendant regarding the doctor's peculiarities, his habits, his family, the number of patients he sees, the number of operations he does, and the kind of automobile he drives. All of these gossipy details are of interest to hundreds of people, but they do not make for a sound, stable relationship in the office. The doctor is extremely fortunate if he can find an attendant of such great tact and intelligence that she can parry one question by asking another, and thus obtain information where information is sought. The patient should be courteously received, offered a seat, asked if she would like to read; and, if so, a magazine may be offered, and thus a seeming obligation to converse may be avoided. In general, coats and wraps should be brought in with the patient when entering the office from the waiting-room. Almost nine out of ten people will leave their coats, wraps, hats, handbags and packages on the chair which they occupied while waiting for the doctor to open his office door, not realizing that thirty seconds after they have been ushered in, someone else is quite likely to come in from the street and find no place to sit. Moreover, it is good practise to have the patient leave by a rear door and not pass through the waiting-room.

But now that the patient and you both sit at or near the desk, the first and important point is to obtain a good history. This history should be taken by the doctor who is to examine the patient, and not by an office attendant or even an office associate, although he be a doctor of medicine. The patient

will appreciate this personal interview ofttimes even more than the examination, for it puts her into personal touch with her advisor, and may change her whole mental attitude toward her condition. Moreover, this little tête-à-tête may afford, not infrequently, a fair guess at a diagnosis. Some physicians prefer to examine the patient first and then take the history. Personally, I always do the opposite. A filing system should be adopted which is uniform, brief, but sufficiently exhaustive. It should be capable of amplification to any desired size. For instance, a card system can be increased by the addition of other cards for further notes and annotations. There are many good cards now in use upon which stamped outlines of various organs can be filled in with pen or pencil, showing the exact location and relative size of any growth or other abnormality. There is no printed form, however, which is uniformly satisfactory, and one must have in mind some sketch or outline or system which will help him to remember to ask all necessary questions in order that no salient points be missed. One should be careful to get the exact and full name, the address—both home and business—name of firm or employer, telephone number, date, place and time of interview, referred by whom, and a note as to whether anyone else was present when the history or examination was made. It is surprising how helpful such notes may sometimes become at a later time. One should always remember that any case with which he has come into contact may become a court case at some future time, and therefore you will be very glad if your notes are not only complete but exhaustive.

This much information having been obtained, your next step is to find out the patient's chief complaint,—you must know at this stage what brought the patient to you. Following this, you may go back into the history for all necessary information regarding the general as well as the special diseases with which the patient has been afflicted. It is always well, too, to know what previous operations have been performed. No record is complete unless one knows the condition of the appetite, the bowels, manner of living, habits such as smoking or drinking, etc. While all this is going on, you must subconsciously study the patient out of the angle of your eye. Her manner of speaking, her physique, her position in the chair, all of these apparently insignificant matters count for something. Let her tell her story, even if it be a little long-winded, but make her stick as closely as possible to germane facts.

Supposing, for instance, you have a rather stout individual before you with rosy cheeks, rather thin, dry-looking hair, with apparently very little hair on the general body surface, who sits lazily and apathetically before you,—here is a suggestion that there is some endocrine disturbance or mental instability. Something may also hint to you that you are not hearing the truth, the whole truth and nothing but the truth.

After a satisfactory history has been obtained, one is ready for the examination. The watchword during an examination is: "Guard your tongue." You will often be asked for a final opinion before you have had time to do more than give a cursory glance. In fact, several sittings may be required

in order to render an opinion that is worth anything. Suppose that the patient is suffering with an acute rhinitis. This may make the septum appear crooked or the turbinates hypertrophied. Be careful in such a case about advising an operation. A septum operation may already have been performed, and when the rhinitis is well the nose may look entirely different to you. Above all, do not criticize the operative work of your predecessor. You do not know anything about the extraordinary conditions he may have met, or the struggle he may have had to overcome the peculiar whims or objections or nervous reactions of the patient. There may have been unlooked-for and uncontrollable bleeding, for instance, or the patient may have fainted several times during the procedure, or many unforeseen things may have happened, all of which were not preventable, but they had their influence in determining the final result.

In my student days a good story used to go the rounds of a certain famous nose and throat specialist who had an enormous clientele; in fact, he had so many patients that it was impossible for him to do any of them full justice, and his diagnosis and treatment were limited to the least time-consuming process. On one of his busiest days an excessively modest young woman came in for examination. She was of the type known as the "Yes, sir" and "No, sir" variety, which must have been pleasing to the busy practitioner, who had no time for conversation. He sat her down in his examining chair, hastily pried open her mouth with a tongue depressor, and said:

"So you have had your tonsils operated on, have you?"

"Yes, doctor."

"Well, no one would know it. Of all the rotten operations I have ever seen, this is about the worst!"

"Yes, doctor."

"Who did this operation?"

"Excuse me, but you did, doctor."

This story serves as a reminder that one should always go slowly in his criticisms.

When proceeding with the examination, if one examines the ears it is a good point to look into the good one first. In all cases, one should use warm, clean instruments, preferably just out of the sterilizer, within the view of the patient. It is very reassuring to know that everything is clean and comfortably warm, and to this end it is not a bad plan to wash one's hands where the patient can know what is going on, as she may not fancy being handled by the same hands which examined her predecessor. Avoid offering a used towel as you would the plague, and protect the patient's clothing with a clean towel or apron in order that no drop of staining or soiling drug may give annoyance. Inquire if she has a handkerchief, or, better yet, provide one and do not inquire. Never jerk or pull or act as if you are in such a hurry that you cannot be thorough. Use as much time as you need, but do not waste a second. Charge for your time or do not take the case. You cannot afford to be slipshod or sloven no matter what happens.

In examining the nose, proceed cautiously, as you may hurt the patient promptly if she happens to have a furuncle in the vestibule. It is also easy to

catch one of the little hairs in the speculum and bring tears to the patient's eyes. This blunder is sometimes not only uncomfortable but momentarily painful. Study thoroughly the turbinates, meati and septum. Be sure to look down along the floor of the nose. Spray in or mop in a little cocaine solution so that you can palpate with a probe. Examination by this method should be the rule, as touch will convey a very different idea from sight. Even more important than a deviated septum is an enlarged inferior turbinate which extends backward into the pharynx and ends in a posterior tip. Such patients complain of an alternating stuffiness of the nose, and usually post-nasal dropping as well. Examine carefully for discharge coming from beneath the middle turbinate. This may give the first hint of an active or latent sinus trouble. Then ask the patient to hum on one note continuously, closing the nostrils alternately with your fingers. In this way, you will be able to tell whether the sound comes through more clearly on one side than on the other, which will give some idea of the head resonance. Whenever possible, the post-nasal space should be studied by the small mirror or naso-pharyngoscope.

In examining the throat, do not neglect the tongue, teeth and gums, from all of which one may derive considerable information. If the tonsils can scarcely be seen, one should hook back the anterior pillar with a blunt hook and explore the crypts with a probe or applicator. Cheesy particles may be obtained by pressure or by applying a suction glass. In this connection, always examine for glands at the angles of the lower jaw. When using the laryngeal

mirror, first be sure to study the lingual tonsil. There is sometimes a good deal of difficulty in seeing the cords, and it may require several examinations before this can be thoroughly done. You must determine the color, size, shape, length and presence or absence of nodules, etc., at a glance. Also, whether the cords are too dry or too wet, both of which facts are significant. It is also important to know the condition of the sub-glottic region, as there may be a tracheitis. If the patient complains of a tickling sensation in the episternal notch, and if there is redness of the tracheal mucosa with irritating, non-productive cough, the diagnosis of infection of the trachea is certain. It is possible that the cords and larynx in general might look quite normal in such a case, but the singing voice may be entirely out of focus. Most laryngologists say that it is impossible to tell from examination of the cords what the quality and pitch of the voice is; that is, one is not supposed to be able to tell a baritone from a tenor, or a soprano from a contralto, by mere laryngeal examination. In many cases, however, it is not difficult to make a shrewd guess from the general contour of the nose and pharynx, combined with a view of the larynx. The tenor's cords are usually short and thicker than those of a baritone or basso, which are longer and flatter. A similar relationship holds good for the difference between soprano and contralto or alto. It sometimes is a matter of some importance for the laryngologist to be able to determine in just what classification a voice belongs, for it is not uncommon to find pupils being trained out of their proper sphere, particularly if a voice is naturally low and

they want it to be high. Great, and sometimes permanent, damage may be done to the vocal mechanism by this mistaken idea that the voice can be screwed up out of its proper range. After the examination has been thoroughly conducted and notes have been made on the findings, it is proper that one should report to the singing teacher or physician, especially if any thought of operation comes into question. Where the pupil is a minor, no treatment or operative procedure of any kind should be undertaken without the written consent of one or both parents if they are living. The consent of a sister or an aunt or next of kin is not sufficient for any one of several reasons. In the first place, the physician may be unable to collect a fee for his services, because the guardian or parent may say that consent to the operation was not given, or they may refuse to pay the bill, or they may sue for damages in case any unforeseen thing happens, such as hemorrhage or other undesirable eventuality. Therefore one should constantly be on his guard, both to protect himself and the patient.

The advice set down here is not a matter of personal opinion, but is the result of reading records of many court cases where physicians have been sued for malpractice.

CHAPTER XI

PHYSICAL DEFECTS

In a rather large group of pupil singers who come to New York each year from all parts of this broad land, it is extremely rare to find even one who has undergone anything approaching a physical examination for the purpose of finding out whether the body as a whole is capable of undertaking a career. Those who have had gymnasium training in college in recent years are, of course, examined and recommended to take this or that form of exercise to benefit certain groups of muscles or to expand certain organs which are backward in growth and strength; but such recommendations are seldom carried out with any degree of thoroughness, and so far as any influence on a vocal career is concerned, such influence is practically nil.

A very large percentage of vocal patients who come to the voice physician do so because they have an important engagement which they fear to undertake because "something has gone wrong with the voice." They seldom come to find out whether the vocal apparatus is in good condition or how they may keep it so. In the presence of acute infections, pain is the only symptom that brings them for consultation and relief. Very often this infection has progressed for weeks, until all mucous membrane areas are affected. It is then extremely

difficult in some cases to avoid operation. If the patient were seen in the first twenty-four-hour period, prompt relief and prevention of further trouble could be afforded in one or two treatments. Such a disease as mastoiditis, for instance, would become practically unknown if the nose and nasopharynx were promptly and effectively sterilized by antiseptic medication at the very beginning of a so-called "cold." Fear and neglect are the fiercest enemies that the physician has to fight, whatever his specialty may be.

It is not too much to say that if the great singer holding a leading place in an opera company were to consult his or her voice physician twice a week during the season and receive prophylactic care, there would be no such thing as postponement or substitution of performances because of vocal ill health. The economic loss to managers, and the untold disappointment and inconvenience to the public are enormous during every musical season. This could be almost entirely avoided if we were all a little more intelligent and resourceful in preventing disease than we are in curing it.

The Government, as we know, demands a thorough examination before it accepts a student of military tactics, and insists that any imperfections be corrected. In this it sets a most excellent example for those in civil life; but did any one ever hear of a vocal teacher demanding that a pupil be sound in mental and bodily vigor before undertaking the exacting, strenuous and prolonged cultivation of the voice?

Loving parents spend thousands of dollars annually on vocal lessons and maintenance while

studying, but did any one ever tell them that it was unwise for Mary or Jane to attempt to do anything with her voice because of a bad heart or poor muscular development or some other chronic ailment? In these matters the family doctor is an unsafe guide, because he does not often know much about the singing problem, and may be honest in his belief that certain irregularities can be greatly improved by deep breathing and studio life in general. This is true only in a very limited sense; for studio life, especially of the strenuous, exacting type, is more of a health taker than a health giver, and many pupils find themselves unable to keep the pace because they are neither physically nor mentally capable of enduring excessive stress of any kind.

General ignorance of health matters and the human tendency to neglect are factors which must be held largely responsible for the poor showing of many young men and women after the student period is finished. There is an old-time and seemingly deep-rooted prejudice against calling in a physician until the worst has happened. Just so long as the body machine can be kept going at a fair rate of speed, the engine is never overhauled. Fuel and water in some form are supplied at more or less regular intervals, but there is no slowing down to see if each nut and bolt is properly adjusted. The machine frequently is run at top speed for years together, and is horribly abused as to the quantity and quality of what is put into it, and as to what is expected to come out of it in the form of energy.

Defective nasal resonance puts undue stress upon

the cords and vocal muscles, giving rise to fatigue and other annoying symptoms. Such defection is often due to some physical obstruction or anomaly in the upper airways such as adenoid enlargements or bony irregularities.

The causes of defective nasal resonance are usually physical. That is, there is some overgrowth of bone or soft tissue which obstructs the nasal chambers and deadens the tone. One of the commonest of these conditions is so-called "deviation of

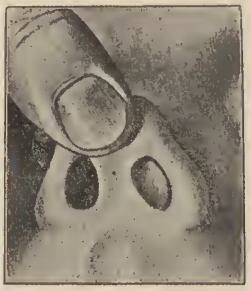


Fig. 11.—Deviation of the nasal septum (partition) causing complete obstruction of the left nostril.

the nasal septum," which is the partition that should divide the nose into two equal right and left chambers, but often so out of plumb that one side, or even both sides are obstructed to the ready inflow and outflow of air. Often there is a history of some injury such as a fall or blow on the nose which has produced a fracture unknown to the victim, but which causes more and more difficulty in breathing as time goes on; or it may happen that normal growth of the nasal bones is in some way perverted, bringing about obstruction as early as the fifth year. One can test the patency and resonance of

the nasal chambers by holding a finger on one side of the nose and humming continuously on a single note. If one side is freer than the other, a marked difference in resonance will be noted as well as in air volume. If this changes from hour to hour or day to day, that is, if one side is now closed, now open, alternating with the other side, then the obstruction is probably due to "turbinate" enlargement. The turbinates are scroll-like bones, three in number, situated one above the other in each nostril, their purpose being to warm and moisten the incoming air. Any increase in their size for whatever reason will diminish resonance and interfere with breathing. (See Fig. 9.)

There are many other types of nasal insufficiency such as polypi, chronic discharge, etc., which need not be described here, suffice it to say that all of these various conditions are amenable to operation and treatment with good results both locally and in improvement of the general health; but with such causes of "interference" constantly at work, one dare not hope that any amount of mere vocal "training" can ever bring a voice to full flower.

Certain physical defects which are not strictly vocal may also hinder the singer from making the success that is his due—for instance an ugly, misshapen nose. Fortunately, in the present excellence of plastic surgery, the human countenance can be "moulded nearer to the heart's desire." If the nose has been broken, it can be quite easily straightened; if too long it can be shortened; if too flat it can be elevated by transplantation of bone so that its contour is quite normal. If it is "humped," a simple operation, not unlike what a

carpenter might be expected to do when working on wood, will make it perfectly straight. As a matter of interest let me recite briefly the report of a case which was highly satisfactory to all concerned. It is simply one of many, and is typical of the so-called "hump nose" deformity.

Some of my patients have been women who have been obliged to go out into the world and earn a living under conditions which made them unusually sensitive to this imperfection and prevented them in many instances from advancing in position and salary. This is particularly true of stage folk, who depend as often upon "looks" as upon histrionic talent for success in their work.

Miss B. was referred by her physician for my opinion as to the possibility of improving her appearance by the reduction of a bad nasal hump. She had already visited an advertising "nose factory" where she was promised a cure if she could raise $1,000, but, this being impossible, her hopes were dashed to earth for the time being at least. There was a history of injury suffered some ten years ago with resultant nasal insufficiency, due probably to a deflected septum. In any case, she had undergone an operation on the nasal partition which was so thoroughly done that there was left a considerable depression below the hump. Our problem, therefore, was to remove the hump and build up the depression. This was carried out in her case as an office procedure, although my preference was that she take a bed in the hospital. Ether was administered until the patient was well anesthetized, then instruments were used to bare the bone, care being taken, of course, not to "button-

hole" the skin. No cut was made in the skin, all work being done from within the nose. The hump was thoroughly freed of all overlying tissue until bare bone could be felt in every direction. With an ordinary nasal saw the projection was slowly sawn off. The piece of bone was removed with ordinary grasping forceps, and the base smoothed down. A small piece of the bone which had been removed was pushed down into the depression until one was sure that the middle line was perfectly straight. Blood clots and débris were curetted and massaged out of the wound so that there might be nothing left behind which could spoil our result. Nothing further was done. The patient was advised, after lying around for an hour, to go home to bed and apply cold compresses to the entire external nose. She said that she had no post-operative pain nor headache, in fact, no uncomfortable reaction of any kind, which is quite the rule in the majority of cases.

I wish merely to emphasize that this is an extremely simple operation with practically no risk, and can be done under local anesthesia in a tolerant patient. There seems to be no need to undergo the expense of hospital care if one has an office operating room where minor surgical work can be carried out aseptically. This is a desideratum not to be overlooked.

About one week is usually required before such a patient is able to take up her vocation once more.

Warts, moles and other like disfiguring marks on the skin of the face and neck can be removed without pain or other objectionable experience. . . . A

singer had writhed for years under the affliction of two seed warts about the size of a pea situated just at the hollow of the neck. She had been told not to have them removed or she would die of a hemorrhage. It required several months so to gain her confidence that she would allow me to operate. After her decision was made, it took less than five minutes to do the work, and in about ten days it was fairly difficult to locate the tiny scars. She has worn low neck dress since that time with great satisfaction. There was no trick about it—any physician could have done it years ago.

An important feature which is, I think, more neglected abroad than in America is the possession of good sound teeth. Toothache is very common in Europe because hygiene of the mouth is so little understood among the masses; while in the United States we have such widespread educational efforts as "the toothbrush drill" in the schools, and hence there is less suffering from aching jaws, and greater conservation of teeth. American dentistry is very highly thought of on the Continent, and the influence of our oral hygienists is just beginning to make itself felt. It has become customary here in this country among the better educated to visit a dentist once in six months in order that he may find and fill any carious spots, and clean off the enamel-destroying "tartar" from the teeth.

In spite of all this, teeth do decay as age advances, and it then becomes necessary to extract them in order to prevent pain and such disorders as "chronic focal infection" which affects the general health. Nevertheless, the pendulum has swung too far, and I am sure that teeth are sometimes ex-

tracted unnecessarily in the hope of relieving facial neuralgia or rheumatism—in some instances the whole jaw is "exodontized," the patient is minus his grinding apparatus, and has the same symptoms as before the extraction. A physician or dentist should, therefore, be very sure of his diagnosis before undertaking such drastic measures.

But if teeth must be removed, every effort should be made to secure a well-fitting artificial denture—first, because the food needs to be thoroughly masticated, second to improve the appearance and fortify the "personality," and, finally, to insure perfection in vocalization—both speech and song. A missing tooth is an abomination to the tongue, and often causes a disagreeable hissing or lisping which greatly detracts from one's impressiveness. Both the vowels and consonants are likely to be imperfectly pronounced, and the sibilants are too much in evidence, so that an audience, whether single or multiple, may become more interested in such peculiarities than in the subject matter of speech or song. It is a curious fact that a spot on a piece of cloth no matter how elegant the material, impresses the eye and mind much more than the whole fabric.

Just a word of caution—all artificial dentures should be removed before retiring, to give the gums and sound teeth, if present, a rest, and to prevent inhaling or swallowing them during sleep. It is surprising how often this happens, and the services of a highly skilled specialist are then required to recover the teeth and save a life.

CHAPTER XII

VOCAL NODULES

Every throat specialist, in the course of his daily work, is at times consulted by singers who complain that they "simply cannot keep from catching cold." There is an inordinate tendency to hoarseness, especially at certain levels of the voice. This hoarseness comes on suddenly without apparent cause, does not seem to be related to exposure, and often subsides almost as suddenly as it came. There is constant fear that an attack will come on at some inopportune moment. An aria is dreaded because hoarseness may develop, and a "break" will reveal the singer's imperfection. Not a few singers with the above symptoms are treated by general practitioners of medicine, and also occasionally, one fears, by an unwatchful specialist, for "recurring laryngitis." This mistake can easily be made if one is unfortunate enough to be unable to examine the cords thoroughly. It occasionally happens that one cannot bring the glottis within the purview of the laryngeal mirror owing to voluntary or involuntary muscular contractions—that is, the patient cannot or will not relax his throat. The epiglottis is far backward and acts almost like a lid in covering the cords. There is also in some patients such an active pharyngeal reflex that noth-

ing can touch the pharynx without producing violent gagging. This precludes all possibility of examination until the pharynx is sufficiently anesthetized to tolerate touching. Of course, much time is thus consumed and several sittings may be required, but the importance of taking plenty of time for diagnosis, and of studying the larynx thoroughly, needs to be emphasized again and again in working with singers. Even the most expert among men is not infallible, but it is the highest prerogative of the man of science to reduce errors to a minimum. Errors due to carelessness ought to be capable of reduction to the zero point.

The actual cause of such symptoms is a growth on the margin of one or both vocal cords and is spoken of as a nodule or node. It acts like a wedge between the cords, thus keeping the edges from approximating during vocalization.

Nodes have been dubbed inelegantly and inaccurately, perhaps, but at least graphically, "corns on the cords." In origin they are not unlike the proverbial much-to-be-regretted and complained-of corn in that they are produced by what may be termed "a mechanical insult." The foot restricted in its movements by a tight shoe, the toe cramped and confined by firm, unyielding leather, rebels against the insult, and, to protect itself, the skin heaps up millions of microscopic cells in certain little spots. This locus dolori constitutes a corn if on a toe, and a "callous" if located elsewhere on the foot. So much for the corn.

Now, a vocal nodule is always the result of a like mechanical insult—that is, there is a disharmony between the vocal cord and its externals. One

might as well face the fact in plain language, viz., every vocal nodule is the result of faulty technic. This is a hard pill for many vocalists to swallow, for after years of untiring effort and at great cost to the individual and all those near to him, it is cruel to find that one's career is likely to be wrecked on the shoals of an improper conception of production of tone. However, the sooner this fact is discovered and acted upon, the greater the possibility that all is not yet lost and that vocal reconstruction is still possible. Some one is sure to say: "That cannot be true, for So and So is a great singer, and he has had these nodules removed several times with wonderful results after each operation." The great singer, yes; but the great artist, no. The great artist is one who has perfected himself in the knowledge of tone production, and has not sacrificed himself to the galleries. He will, in all human probability, never be annoyed by nodes on the cords.

The process by which a node is produced may be explained as follows:

Along the knifelike edges of the cords, there are a few microscopic glands which secrete a small amount of mucus and pour it out of their tiny mouths as a lubricant. Now, if the cords are very tightly squeezed together, obstruction of the mouths of the ducts leading from the gland cells to the surface takes place. This usually follows an acute respiratory infection during which the larynx has been abused. Secretion keeps on piling up within this closed cell region, and we then have a tiny bulge or excrescence projecting beyond the free border of the cord. When the pressure within becomes great enough, the tiny gland empties itself

if the obstruction at the mouth is not absolute. One then sees upon examination a thread of viscid, mucoid material stretching across the space between the cords during quiet breathing.

Certain vocal exercises, vocal rest, etc., may diminish the little retention sac to a point where it cannot be seen. Silver nitrate applied by the laryngologist is also often of great benefit. The case is then "cured," and teacher, pupil, and perhaps doctor, too, feel very proud of this victory. However, just so soon as the singer returns to his old habits

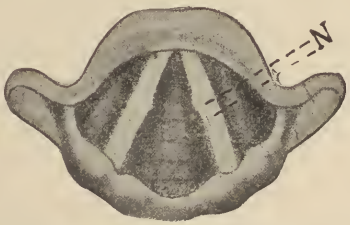


FIG. 12.—Vocal Nodules. "Soft," small variety. Often overlooked, but causing symptoms of chronic hoarseness and deficient vocal power.

of straining and pressing and squeezing, just so surely will the troublesome "node come back." In fact, it was never entirely gone, but was reduced to the point where it could give no more trouble so long as the cause of its origin became inactive. All this applies to the soft node, which, from a medical standpoint, is a simple, incomplete retention cyst.

Let us suppose, however, that the tiny mouth of the tiny gland remains totally obstructed, and the singer's squeezing and pressing continue; we then have what is known as "organization" of the contents of the cyst into a firm, smooth, consistent, solid tissue. This is the true node, hard, firm and

fibrous. No amount of vocal exercises can ever cause this kind of node to disappear entirely. Change of method of breathing, attack, etc., may render it of no great annoyance to the singer, who may "sing over" his difficulty, but in most cases the node must be removed by an extremely delicate surgical operation. Nevertheless, it is entirely useless for a throat surgeon to operate in such a case if the faulty technic continues; for the same cause that produced the first node will likewise produce the second, third or fourth. After removal of such

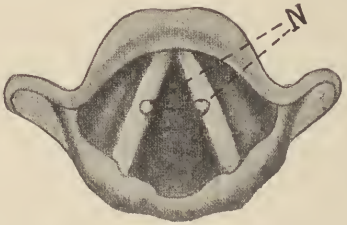


FIG. 13.—Vocal Nodules. Large, fibrous type. Not all of the growths can be shown as they are attached to the edge and under surface of the cords.

a growth, the singer should commit himself into the hands of a scientific, conscientious, skilled teacher who understands the condition as here outlined, and who knows how to readjust the vocal mechanism. Removal is an extremely difficult procedure from the surgeon's viewpoint, and is not unattended by risk, but "to sing or not to sing, that is the question," and there are many who willingly take the one chance that Fate proffers them.

While a vocal nodule is always an annoyance and sometimes is capable of destroying a career, this is not invariably so. One of my patients, a basso-

cantante of fine parts and an excellent artist, has had a very small nodule on the edge of his right vocal cord for at least ten years. Yet, during all this time, he has always had a position with one or other of the various opera companies, and has made a very good living. This may be accounted for, however, at least in part, by the fact that he is almost immune to respiratory infection. During two years in London he sang quite constantly without a "cold" or other vocal disability, and was never examined or treated by a physician during that time. Only the well-trained ear can detect any harshness or huskiness in any part of his voice, and he still sings one of the finest performances of Ramfis in Aida that I have ever heard.

CHAPTER XIII

ON CERTAIN NOSE AND THROAT DISORDERS IN SINGERS AND SPEAKERS

At the very bottom of most ills from which artistic people suffer, there is a subtle psychological element which must not be overlooked, and which must be weighed in the balance with all other findings, no matter of what nature they are. This is, I think, so well understood by most rhino-laryngologists that it is, perhaps, unnecessary to do more than mention it here, since the successful physician is always a good student of human nature, and from his experience is usually able to outline in his own mind just how to manage his patient; that is, he must know what to say, or what not to say, even more than what to do. But putting aside the unstable, fickle, unreliable and often strongly neurotic characteristics, one must go back into the history of every case far enough to determine just how any given disorder began. This may have had its origin in the thoughtless remark of some medical adviser who did not comprehend the psychological elements in the situation, or in some actual physical condition which has been, for the most part, long since forgotten. Of one thing we may be quite sure in practically any case that comes to us for advice; namely, that the singer has never been exactly measured in all those essentials which are indispensable to

uninterrupted and progressive success. The voice physician has, therefore, to constitute himself a sort of physico-psycho-analyst; that is, he must study and investigate a great many details which have to do both with the mental and physical, as well as the artistic life of his patient.

Laryngologists, especially those who are interested in voice, must aim to encourage teachers of singing to do something more than simply to "try out the voice" when a pupil presents herself to begin study. This is a matter upon which I have harped rather continuously in various addresses and articles for some years past, and it has been mentioned in another chapter in this book as well; but the idea seems unlikely to take root in the general public mind unless we as physicians can show that it is for the future well-being and happiness of the pupil, and not to put money into our pockets, which certain ill-minded folk may insinuate. As a matter of fact, from the mercenary viewpoint, we would do better to say nothing about prevention and "patch up" the singer from time to time; but this is not the way of modern medicine, as every intelligent person knows.

The intoning of a few bars at the piano, or the hearing of some simple song, is ordinarily all that the maestro requires before voice lessons are started. Nothing is known of the physical condition of the candidate, and it is usually considered sufficient to possess a beautiful, or even just merely a good voice, and that hard work will do the rest. No greater fallacy exists; for the factors which go to make a successful artist are so numerous that one can hardly undertake to write them all down, much less

to study them at first hand. Many a singer with good natural gifts, fails miserably because of some unconsidered fault of personality or mentality which could have been adjudged by the practiced eye to be irremediable at the outset. Or again, failure may result from utter disregard of simple, easily controllable elements. It would be of everlasting benefit to all concerned if the teacher, at his first interview with a pupil, should ask for the co-operation of the laryngologist who has paid some attention to the voice problem, and secure from him a written report of his findings, including his opinion as to the possible development of the voice under certain natural physical handicaps which so often are joined with good talent. To illustrate just what is meant: suppose that way back in childhood an attack of laryngeal diphtheria has left certain muscles impaired; that an intubation has been necessary, for instance, or that a certain amount of paresis in contradistinction to paralysis has persisted. Or, assume that scarlet fever at some forgotten period has invaded the ears and has left its deadly menace behind in the form of chronic middle ear suppuration which lights up sharply with every acute respiratory infection, or that the lesser evil, deafness of moderate degree, determinable by modern exact tests, makes accurate pitch judgment impossible. Is it not fair to say that one can scarcely recommend the vast expenditure of time, energy and money in the pursuit of an *ignis fatuus* which may end in dreadful disappointment or even tragedy?

It is a common experience for the doctor who for want of a better name has been called a "voice physician" to have a patient come in with the fol-

lowing story: This girl is 26 years of age. Ever since childhood she has been told that she has a beautiful, even marvelous, voice. Down in her little home town, let us say somewhere in Tennessee, there is a village parson who is thought to be something of a connoisseur in music. Soon after taking up his pastorate he hears Dorothy sing, she impresses him greatly with the purity and sweetness of her "naturally" produced voice, and he accordingly drafts her for the village choir. The postmaster, a pillar of the church, wishing to encourage the girl, tells her that she ought to go to New York and "take up vocal," as they say in the hinterland. This opinion is reinforced by the local doctor and by all of the aunts and uncles, who are likely to be both numerous and unanimous in their praise. Not much urging is needed in any case, so it is decided that Dorothy must go to the city called Gotham, where such talent may be reasonably expected to be recognized by stalwart headlines in the great dailies. Well, the girl and her mother arrive and are surprised to find just what they had expected to be surprised about, namely, that there are a great number of singing teachers who are more than anxious to "work out" Dorothy's musical salvation. The girl's ambition has now been kindled to a frenzy, and to make the Metropolitan Opera in about a month seems so easy that the secret is confided in numerous letters to waiting worthies back home. Two years go by and Dorothy now finds herself in the hands of her sixth singing teacher who has torn down all of the work done by his previous five confrères, and, starting all over again, soon finds that his pupil has come to an

impasse. She is not making the desired progress and in desperation a laryngologist's advice is sought. The doctor gets to work and tries to measure the physical and vocal capabilities of his patient. He finds that the chest muscles are undeveloped and that Dorothy stands and walks with a crooked

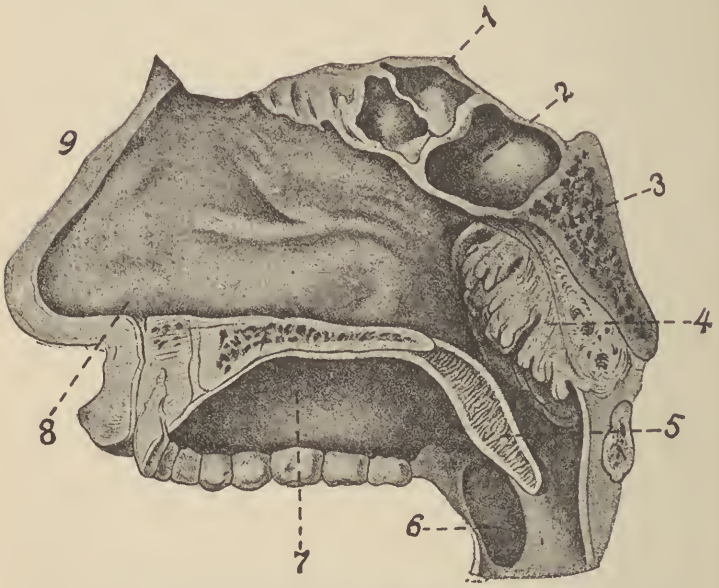


Fig. 14.—Interior of the nose. 1. Ethmoid cells; 2. Sphenoid sinus; 3. Body of sphenoid bone; 4. Very large adenoid; 5. Uvula; 6. Right tonsil; 7. Hard palate; 8. Entrance to nose through nostril; 9. Nasal septem (partition).

spine. There is in consequence a good deal of lung tissue that is only partially filled with air. The girl is awkward in every movement. She knows nothing about diet or exercise. Her voice is shrill, badly produced, uneven throughout the musical scale, and strangely unresonant. There is a deviated septum,

hypertrophied turbinates, and an adenoid which, seen by posterior rhinoscopy, looks like the back drop at the Hippodrome. The tonsils are "cheesy," and there are several small glands at the angle of the jaw on each side. He recommends several operations, but his suggestions are not kindly received by the teacher, who says that a month of interruption in lessons cannot be tolerated. He has to make his living, too, as well as the rest of mankind, and, to be frank, would have sent the girl in before, but felt sure that the inevitable would happen, and that the doctor would hold it his bounden duty to find something to operate on. The opinions of the teacher and doctor go back home, and so does the girl, without having anything done; for she is discouraged beyond measure and probably wants to die.

Now this recital, although humorous in its essence, is of the truth. It is a daily affair and is destined to continue unless in some way laryngologists can secure the co-operation both of teachers and parents. The difficulties of compromise are indeed great, but the patient's interests come first and it is certainly our duty as medical men to do what we can to spread the gospel of early and thorough examination of all would-be candidates for vocal honors.

In the prevention of ills common to singers and speakers (actors), the physician must inform himself, as already mentioned, about the influence of common diseases of childhood, especially concerning the ills which lie in the wake of the exanthemata. These are in the last analysis respiratory infections for the most part, the first symptoms of which ap-

pear as *en*anthemata,—witness Koplik's spots in measles, the strawberry tongue and red sore throat of scarlet fever, and the sticky exudate in diphtheria which we call "membrane." Fortunately, most of these diseases clear up without persistent sequelæ, but they have a bearing on the health of the nose, throat and ears which ought always to be kept in mind.

Tonsils and adenoids must be removed, if diseased, or if they cause symptoms through obstruction. As time goes on we shall have to consider them less and less in adult singers, since they are being so generally removed in childhood. But the end results of unsuccessful or faulty operations will always confront us and will afford knotty problems at times; for instance, where the uvula has been removed or the naso-pharynx greatly narrowed through atresia.

Sinus involvement in children, which is being intensively studied by many of our best rhinologists at this time, is an important theme, because, if unhealed, it may lead to many chronic conditions, such as atrophy, chronic post-nasal discharge, chronic hoarseness, etc. Where the diagnosis is readily manifest in adults, one cannot expect to overcome the condition or to relieve it so that a vocal career can be hoped for. Permanent pathological changes in the respiratory tract must always be looked upon as having grave importance for the singer, and this is almost equally true of the auditory tract as well. A deviated septum in childhood, the result of trauma or as an expression of familial divergence from the normal, is always of importance to the growth and health of the individual, so that

it often becomes a serious question when we take all factors into account, whether we ought not to attempt submucous resection on a child regardless of the resultant deficient growth or deformity of the external nose. I am inclined to believe that as time goes on we will become more radical in this regard, expressly so in cases of extreme deviation which produce occlusion of one nostril; for the end result to the patient may be just as unfortunate as persistent enlarged or diseased tonsils and adenoids. Life and health must, of course, always come first and looks must follow in their train.

In order to understand the disorders common to singers, one should have some conception of the mechanism of voice production. Although this has been touched upon in an earlier chapter, it may not be out of place to take it up here in a little more systematic fashion. Reduced to its lowest terms, production is composed of three elements or factors: 1. The motive-power element. By this is meant the muscular force which so acts upon the air tract as to control both the volume and power, making it possible to increase or diminish the emitted sounds to any desired degree. One commonly hears teachers and singers speak of the diaphragm in this connection as if it alone were the only motor muscle to be considered, but it is only one of many; for the well-trained singer uses nearly all of the muscles of the body in securing his effects, especially those which make up the torso—the thoracic and abdominal groups. 2. The laryngeal element. The voice is, of course, produced at the cords through vibrations which are set in motion by air waves coming up from the lungs, the vocal bands being under the

control of the intrinsic and extrinsic laryngeal muscles. 3. The resonating element. Resonance is commonly thought to take place in the chest, in the ventricles of the larynx, in the naso-pharynx, the nasal fossæ, beneath the turbinates, and in the accessory sinuses.

Now a variation from the normal function in any one of these can set up a series of permutations and combinations which alter the pitch, power, intensity, volume, timbre, quality—in fact, all of those peculiar fundamental factors which we group together and call "the voice." For example, if one holds the

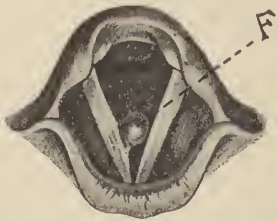


Fig. 15.—Fibroma growing from the left vocal cord, causing chronic hoarseness.

nose he immediately changes the relationship of these three elements, and the voice is described as having a nasal quality. If he should inject some substance such as paraffin into the cords so as to change their size or shape, the ear would detect a change in quality and power. Finally, if the chest were strapped or otherwise held in a vise-like grip limiting all muscular movements, there would be loss of power, volume and probably a change in voice quality.

Let us apply these simple principles to disturbance of function which we see every day through

malformation or deformity of the nose. A patient with a badly deviated septum always has a peculiar vocal quality. The voice is high pitched, has poor carrying power, and is deficient in resonance. The column of air as it comes into the naso-pharynx divides into two streams, part going to each side of the posterior edge of the septum. If the fossæ are equally free, the length of the air column is the same on both sides, and the resonance on both sides is about equal. But if the air column is shortened in one fossa through obstruction, the tone is dampened and sub-resonant. This is very well seen by humming into the nose on a single note and pressing the nostrils alternately, when a marked difference can be noted by the examiner which may be scarcely perceptible to the patient. The difference is, perhaps, more noticeable in the presence of hypertrophied turbinates, or polypi, or in the presence of a generalized swelling within the nose due to an infection (acute rhinitis), or after various nasal operations until the so-called reaction has disappeared. In such a case the voice is not reinforced and most of the vocal effort lies across the level of the vocal bands. If prolonged or strenuous vocal exercise is indulged in under such conditions the voice becomes husky or hoarse or even aphonic. That is why we ought not to allow our patients to sing or make public speeches in the presence of a "cold," for, in doing so, they jeopardize the larynx and may bring about a vocal strain which is permanent insofar as great vocal effects are concerned. The voice may never be quite the same again. Careful examination of the larynx will show a sticky secretion on the edges of the cords and even a slight

bowing, so that a very great muscular effort is required to bring the bands together in full alignment, and soft-voice work, such as pianissimo, is rendered impossible. As already mentioned, this disability may lay the foundation for the development of vocal nodules.

In advising as to the possibility of taking up a vocal career, one should make sure that the candidate possesses an anatomical configuration which is naturally good or which can be surgically moulded to the required degree. The essentials are: a free nose, properly warmed and moistened air (good turbinal function), a roomy naso-pharynx, normal action of all palatal muscles, no adenoid, normal faucial and lingual tonsils, vocal bands free and quickly responding to the will, arytenoids normal (uncrossed), chest volume and expansion good, breath control good. Asymmetry in the larynx, especially the crossing of arytenoids, is regarded as unfavorable by practically all authorities. E. Barth makes the point that "in spite of careful schooling and great zeal for work the voice in its upper range and when used *forte* remains tremulous and uncertain" in practically every such case which he has studied. This is, of course, a condition which is not amenable to any known treatment, surgical or other.

But with all the essential factors quite normal—anatomical configuration, good general health, a strong athletic body, et cetera—one must remember that bad use of a good voice will most certainly ruin it eventually. The singing teacher is too often blamed for conditions over which he has no control; for example, a pupil after a few lessons takes a position as "cabaret artist," whatever that may mean,

and attempts arias from grand opera roles under the most adverse conditions, such as noise, smoke and bad air, and failing to make good charges the teacher with having ruined her voice. So that in the absence of any inflammatory signs or symptoms, the laryngologist may be somewhat puzzled as to the cause of vocal disability unless he keeps in mind the mode of life and the wilful ignorance of many young singers.

The upper airways are even more subject to local infections than the lower, although many persons never have a "cold in the head" which does not extend downward into the larynx, trachea and bronchi; and, as already mentioned, it is the attempt to "sing over" this disability which lays the foundation for much future trouble. The end result is a secretory disturbance of some sort, post-nasal dropping of mucus or muco-pus which later on often changes into a dry condition; and, as every singer knows, a dry throat is more difficult to manage than a wet throat. Sometimes "the cold" seems to have cleared up and is almost forgotten by the patient, but still the voice gets husky and does not respond to the urgent efforts of the will. This is a type which I have ventured to call "Latent," because to the examiner there is very little which can be seen, and I am inclined to believe, too, that it is this type which leads most often to mistaken advice as to the necessity for some operation. The sub-glottic region just beneath the vocal bands seems to be the *locus minoris,* and if one studies this carefully and asks the singer to phonate, he will often be rewarded by seeing some tiny droplets of mucus work their way up over the surface of the cords. When the patient

feels this obstruction to the use of his cords, he often clears his throat and produces a sound described as "A-hem," which is nothing more nor less than a shaking of the vocal bands to free them of secretion. The throat then remains free and the voice clear until this secretion recurs. In the presence of such secretion the voice is husky and breaks easily; that is, the tone is unsteady, inclines to slide off pitch, and the singer is very much afraid to take a note pianissimo or legato because of the utter spoliation of the vocal effect in case the tone breaks. This clearing of the throat begins as a real necessity and ultimately may become a habit long after the hypersecretion has disappeared. Sub-glottic hypersecretion is in all probability one of the causes of phonasthenia or voice weakness because it leads inevitably to forcing, chronic hoarseness, and so-called relaxed larynx, dissipating the vocal power and encouraging the formation of vocal nodules. Garcia in his "Hints on Singing" says that phonasthenia or voice weakness causes "hoarseness, relaxed throat, languor of the organ which refuses to execute passages generally possible, dryness or heat in the throat, difficulty in swallowing, and fatigue after a few minutes' exercise."

A few illustrations from actual case histories may serve to impress on the mind certain points which I have tried to elucidate in this chapter. Certain changes have been made in the actual case histories in order that identification be rendered impossible.

A young woman of unusual vigor and possessed of apparently all the essentials necessary to a good career as a vocal artist came in with her singing teacher for examination. For some months she had

been troubled with sneezing without any other signs of so-called hay-fever or pollinosis, or whatever one chooses to call that peculiar syndrome or symptom complex which has baffled rhinologists for many years. There was slight thickening of the septum, but no deviation. Resonance was good and the air stream from both nostrils satisfactory. No contact points could be found nor any hypersensitive areas on the mucosa of septum or turbinates. In other words, a satisfactory diagnosis could not be made without going into the protein sensitization tests. An alkaline spray containing a tiny amount of adrenalin was prescribed, also blennotasin tablets, which have a certain vogue in these conditions because they are said to dry up excessive nasal secretion. Not satisfied with this, the patient went on a journey to a relative who is a rhino-laryngologist. This gentleman did an extensive submucous resection, removed both middle turbinates and cauterized both inferior turbinates. The result was brilliant in that sneezing stopped at once. But the nose is now so wide open that the airways are constantly dry and scaly, and the voice has that peculiar quality which has been described as rhinolalia. The larynx, too, is becoming dry and the vocal work unsatisfactory. One must conclude that this patient is the victim of too much radical surgery; for nothing taken out can ever be replaced, and what may seem to be the shortest road to a brilliant result may prove in the long run to be the least desirable.

At a well-known vaudeville house a singer without any special qualifications and with practically no training, while striving for a high note, suddenly became hoarse. Examination about an hour

and a half after the accident disclosed a hemorrhage into the substance of the left vocal cord. The condition was explained as well as one could, and the prophecy ventured that it would respond to treatment in about two or three weeks. Looking further for a cause, there was a bad deviation of the nasal septum on the side of the lesion, hypertrophied inferior turbinates, and post-nasal secretion which dripped into the pharynx and probably on the cords as well. The advice was given to have the nose operated upon at once, then, during the post-operative period, the larynx could be treated and no time would be lost, but it was also emphasized that a change of vocal method would have to be made lest the condition recur again. Instead of considering this advice the patient went to a neighboring city and was assured by a laryngologist that the hemorrhage into the cord was a myth, and that submerged, diseased tonsils were the sole cause of the hoarseness. Accordingly, a tonsillectomy was done, but the patient bled so profusely that he was rushed to a hospital, where a ligation of the external carotid was done by a general surgeon and the patient's life was saved. He has never done any public singing since and I am unable to say what happened to the cordal hemorrhage, but it was undoubtedly absorbed.

A lyric soprano doing her turn in comic opera was much distressed because of sudden attacks of hoarseness associated with a good deal of laryngeal secretion. Small vocal nodules were to be seen on each cord, but by treating the larynx the patient was enabled to continue at work in the hope of tiding her over into the dull summer season. It was planned to remove the nodes, as they were not of the type

that can be "sung off," as the expression goes. Meanwhile the services of an experienced teacher were to be enlisted with the idea of changing the method of production and "re-set" the voice, so to speak. Through some misunderstanding there was an error about an appointment and the singer left my care in anger and went to another specialist, who told her that the real difficulty was not nodes at all, but a film of uric acid that had spread over the entire cordal surfaces. He put her on a diet and advised an elastic abdominal belt for some real or imaginary visceroptosis. At the next performance the restriction of the abdominal muscles and diaphragm showed in the voice, which was thin, weak, of poor carrying power, and could not be re-enforced through resonance from the chest and head. A few days later this singer was virtually carried from the stage and was obliged to spend some weeks in a sanitarium. A period of inaction followed, covering about two years, and the lady is now singing very well. What happened I do not know, but one can hardly assume that the uric acid theory is responsible for a cure in this case.

The following vocal disability was assumed to be due to a post-influenza condition: A tenor had made a good record at *La Scala* by singing Caruso rôles after that justly famous and greatly lamented artist had signed up with Metropolitan. Having finished his European season, this man, who was of very unstable nervous temperament, crossed the ocean to seek further laurels in America. *En voyage* he contracted a cold and landed in New York quite ill. After two or three weeks in bed with a condition which his general practitioner called influenza, he

was sent to Lakewood to recuperate, but found to his great alarm that his voice was notably deficient in power, intensity and range. Whereas, he had formerly possessed the remarkable range of three octaves, he could use only about two at this time. The voice was "foggy," broke easily at F sharp and G natural, could not be sustained and was produced only by a great muscular effort, in other words, by "squeezing" the cords together which fatigued him greatly. He was subsequently treated by several laryngologists, one of whom applied pure tincture of iodin to the larynx, followed by oil sprays! This was continued daily for some two weeks, and he was advised when visiting the doctor to walk around Central Park preceding each visit. Finally he came under my care through a patient whom he met in Lakewood. Examination showed nasal insufficiency, some bogginess of the turbinates and post-nasal discharge of pus-stained mucus. There was much secretion on the cords which did not completely approximate throughout their entire length, but left a bowed, elliptical space about the middle of the glottis chink. Only by forcing could high notes be produced, and soft voice work—pianissimo—was impossible. Cleansing and astringent antiseptic treatment, silence, followed in about three weeks by vocalisées to strengthen the strained laryngeal muscles, was carried out. In about two months he had completely recovered and finally returned to Europe, where at last reports he was doing well.

The most aggravated conditions are seen in vaudeville singers, who are usually people of talent with little or no training in the proper use and care of the voice. Their work is constant and fatiguing to the

last degree, and they never feel that they have time enough either to learn the fundamentals of voice production or to be treated when most in need of it; and, hence, are likely to consult the laryngologist only when *in extremis*. Most of them do from two to four turns a day under conditions which would wear down the most accomplished and highly trained vocal artist, "go on" after excesses of various kinds, work straight through an acute infection of the air-ways, and violate all of the rules of voice hygiene generally. The necessity of keeping them at work offers a difficult and disturbing problem and is quite generally unsatisfactory. Very often the anatomical configuration is anything but good,—the nose is stuffy from turbinal enlargement, the septum is deviated, latent or manifest sinuitis exists, especially of the hyperplastic variety with chronic post-nasal discharge, and, likely as not, chronic tonsilitis as well. In fact, the entire list of common disorders of the airways may be found in a single case.

A good example is that of X. Z., who has had many years' experience on the vaudeville stage. He is a large man, weighing 225 pounds, possessed of a powerful tenor voice, harsh at times but not without a pleasing quality which brings him a "good hand" from his audiences. He has never taken any care of his vocal apparatus but has indulged in all of the joys common to a profession always *en route*. Nevertheless, he has earned a good living for his family for 20 years. At the time of his first visit he had, to use his own phrase, "joined the down-and-outers." Examination showed a marked deviation of the septum, hypertrophy of all turbinates, and a sticky post-nasal discharge which he could remove

only with great difficulty and by making a disgusting noise. The pharynx seemed dry and slightly puckered (pharyngitis sicca of mild degree). The tonsils were quite large, deeply buried and contained "cheesy" material which was expressed from the crypts. Laryngeal examination disclosed thick, rather beefy cords which did not approximate well because of a thickened posterior wall and inter-arytenoid hyperplasia,—apparently the result of a chronic productive inflammation of the mucosa. There was some thickening of the tracheal mucous membrane and the rings could not be readily counted. Mobility of both cords was unimpaired save for the inter-arytenoid condition just noted. He had taken cough medicines and inhalations on the advice of physicians in the various cities he had visited without any marked relief, and he persisted in using the voice in spite of all caution as to the value of silence treatment. However, in the summer of 1919 he accepted my advice and underwent a submucous resection of the septum plus a reduction of the turbinal hypertrophy. At a later sitting the tonsils were removed under local anesthesia, and still later on I exsected the inter-arytenoid and posterior wall thickening. The final result was a nose normal both for breathing and resonance, a satisfactory fauces, the pillars being intact, although fused together partially, and a smooth laryngeal posterior wall and commissure with normal function of all laryngeal muscles. He then went on tour in the fall of 1919 and sang songs which he had not dared to put in his repertoire for many years. There is still, of course, a woeful lack of *savoir faire,* but he got "full time," as the routinières say, and regarded

himself as absolutely rejuvenated. Only recently, however, he returned to New York from a town in Texas where he was playing and underwent treatment for an acute infection of the entire air tract, through which he sang until forced to quit by dint of circumstances, but at this time is all right and at it again. Curiously enough there seems to have been no tendency to chorditis nodosa at any time, a condition which ought to have appeared by all known rules, but perhaps the thickening in the laryngeal posterior commissure may have been the expression of what in another case would have been an avowed nodal growth.

CHAPTER XIV

THE TONSIL QUESTION

This is a matter of such importance to the singer that one must go into it quite fully. When a physician speaks of tonsils he usually has in mind that they are not two but four in number,—the adenoid situated in the vault of the pharynx behind the nose, the lingual tonsil at the very base of the tongue, and the lateral or faucial tonsils situated, one on each side of the tongue, just below the free border of the soft palate. It is with the latter that we are especially concerned, since they are so frequently subject to acute infection with the onset of violent symptoms.

From observation one rather definite conclusion may be drawn; namely, that the tonsils are a sort of sieve or first line of defense, and screen out from the blood and lymph streams, disease germs which either are circulating in these fluids, or are introduced into the mouth with food or close contact with people who are carriers of infection.

Not infrequently the physician observes cases of acute nasal infection with or without discharge of pus which are followed by an attack of acute tonsillitis. After nasal operations, for instance, sore throat is not infrequent, and when we examine the tonsils we find redness, swelling, and pain on swal-

lowing with possibly fever and general malaise. Evidently, therefore, tonsils which are functioning normally are useful organs, but when they become diseased they are a menace to bodily health.

In recent years we have learned that rheumatism is not infrequently caused by tonsil infections, and every case of rheumatism should be studied by the physician with this possibility in mind. There are, of course, many other foci of infection from which rheumatism can take origin, but once the tonsil is convicted, we can easily eliminate it as a source of further trouble.

The construction of the tonsil is very favorable to infection. It is a small round or flattened mass of gland tissue studded with small holes called follicles. These follicles stand ready to catch particles of food and drink, germs which are ever present in the mouth, and, in fact, any débris cast off from the mucous membrane lining of the buccal (mouth) cavity. When putrefactive germs find a place in one or more of these crypts, there is just sufficient heat and moisture to cause them to multiply, and in a few hours we have the well-known sore throat, redness, internal swelling, pain on swallowing, glandular swelling in the neck, general malaise and rise of temperature to 102 or 103 degrees Fahrenheit. Pain in the back and bones, and general depression are due to the absorption of poisonous (toxic) material into the blood stream, and the subsequent effect on the nerve centers.

About this time Nature tries to come to the rescue, and the body begins to manufacture a toxin of its own which is intended to neutralize the effect of

the germ toxin. But in many cases the germ toxin has a great handicap over the body antitoxin, and

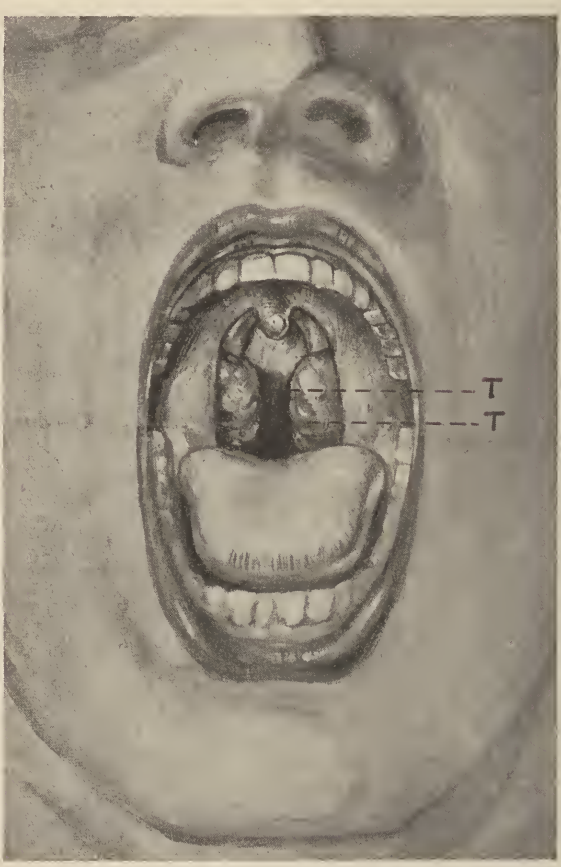


Fig. 16.—Enlarged and diseased tonsils.

several days pass by before the invading enemy is conquered and eliminated.

During this period of infection the patient suffers

considerably, and is thoroughly determined to have the tonsils removed as soon as he recovers. Time is a great healer of trouble, however, and once the body condition returns to normal, the patient usually decides that another attack is unlikely and confesses himself willing to "take a chance."

Whatever may be said for or against tonsillectomy in other persons, in singers it is a matter of vital importance. The laryngologist is confronted daily by the eternal question: "Doctor, if I have my tonsils removed, do you think there is any danger of my losing my singing voice?" The patient who frames this interrogation usually has a long story to tell of someone who has had the tonsils removed and was never able to sing thereafter. It is nearly always a hearsay story. Seldom do we find anyone who has seen a "before and after" demonstration of this disability. Many singers, when questioned, acknowledge that they can recall no specific instance of lost singing voice following tonsil removal. Nevertheless, feeling that this subject is worth sifting out, and in order to get first-hand information, a questionnaire was sent out to 500 physicians, and to 500 singing teachers. A surprisingly large number of answers were received, and it was gratifying to note the interest that the matter seemed to inspire. Many of the busiest and best known men not only answered the questions but took the trouble to write a personal note as well. This personal element has added greatly to the interest of compiling and classifying the necessarily varying opinions. I shall present the evidence adduced covering 5,000 operations.

To physicians.

Question 1. How many singers approximately have you tonsillectomized? One hundred and eight men reported 3,427 tonsillectomies. Of these, some could not spare the time to look up records; others kept no records, and five were against operating on singers at all.

Question 2. Did cicatrical (scar) contractions of the pillars and soft palate result in any case? Out of 341 cases, only 46 showed cicatrical contractions, which is truly an excellent operative record. On the other hand, one gentleman said he had "observed" two hundred cases operated on by other surgeons, "many" of which showed such contractions. Another surgeon had "treated" 100 post-operative cases in 22 of which (22 per cent) he found cicatrical contractions in the fauces. It is fairly impossible to form any accurate judgment of this matter owing to the guesswork with which many physicians seem to be laboring. The word "many," "few," "several dozen," "great number," etc., shows the mental haziness which descends on our horizon when we try to collate facts for scientific purposes. However, in order to strike an average we may say that cicatrical contractions seem to be present in about one-sixth of the total number of cases reported.

Question 3. What were the effect of tonsil operation on the singing voice? A, good; B, bad; C. no change. This is the salient question in the inquiry, and yet it was frequently answered in slipshod fashion or overlooked entirely. One hundred men reported good results in approximately 2,849 cases;

while 29 men reported no change. Four physicians declared absolutely bad effects, but did not go into particulars as they were especially requested to do; therefore, we are in the dark as to what these bad effects were. Two of these men had never operated and the other two had done "very few" operations. Both declared their observation to be based on a "large" number of post-operative cases sent to them for inspection.

Question 4. Were these effects temporary or permanent after one year? In all cases the good effects were permanent. In cases where untoward or bad effects were noted, they disappeared within from one to three months after operation. No bad effects seem to have persisted after the third month. A great many men expressed dissatisfaction in not being able to follow up their cases in a proper manner, since pupil singers migrate to larger towns and to Europe. In general, singers as a class, are fond of consulting many different specialists in the cities where they visit.

Questions 5 and 6. What bad effect, if any, was complained of, and what do you think was the cause of this bad effect? Ninety-five men reported no bad effects in a total of 2,904 cases. One holds the proud record of 300 tonsillectomies without a single bad effect of any kind. Thirty-eight men reported bad results in 172 cases. These were in outline about as follows:—

Vocal stiffness for a few weeks. Decreased volume and impaired quality.

Difficulty with the flexibility of the top voice.

Voice lowered and range limited.

Difficulty in placement or loss of placement.

Loss of purity and sweetness of tone.

Metallic quality.

"Catch" in the voice.

Dryness of the throat and a sensation of a feather tickling the throat.

Vocal fatigue after vocalization.

The causes of these untoward symptoms as viewed by the specialist were: Faulty operative technic whereby the pillars and soft palate were injured; changes in the faucial contour due to cicatrical contractions; involvement of fibres of the glossopharyngeal (9th cranial) nerve; temporary inco-ordination of vocal musculature; lost lubricating function of the tonsils; relaxed pillars necessitating a re-arrangement of the resonating influence of the pharynx and nasopharynx; and, finally, using the voice too soon after operation.

One surgeon reports 3,500 tonsillectomies. Of the subjects, about fifty were singers, and in none was there any difficulty except "stiffness of the throat" for a few weeks.

Question 7. What type of tonsil (buried, small, hypertrophied, pedunculated, etc.) in your opinion gives the best chance of voice improvement after removal? All are practically agreed that the hypertrophic (enlarged) tonsil offers the best hope of improvement. The best answer probably is that any diseased tonsil, whether large or small, should be removed if such disease and resultant symptoms have been established beyond peradventure. Some years ago, Prof. O. Chiari of Vienna, showed that greatly hypertrophied tonsils may be removed with impunity only if we calculate beforehand how to prevent relaxation of the palatoglossus and pala-

topharyngeus muscles. Removal of such a mass of lymphoid tissue leaves a large fossa which must be filled in by granulation tissue and subsequent scar. He always felt it wiser in such a case to do a tonsillotomy (partial removal) and to treat the cryptic stumps with chromic acid or the electrocautery after healing is fairly established.

This brings us to the crucial question.

Question 8. Do you know of any case in which the singing voice was apparently destroyed by a tonsil operation? Only fifteen men out of 133 confessed a knowledge of any case in which the singing voice had been destroyed by operation. The inquiry was intended to apply to patients who had been obliged to give up all effort to sing after tonsillectomy. One man replied: "Lots of them, as a result of injuring the pillars during radical extirpation. I consider enucleation *with the capsule* injurious to the voice because of resulting prolapse of the pillars and I apply the old rule, to remove only diseased or hypertrophied tissue." In one case "harm was done by a bungling operation." Doctor X. reports two patients "who stated that they were never able to sing after tonsillectomy," but adds naively that he doubts whether they could sing before the operation either.

Sifting down the "evidence" of these 15 laryngologists who align themselves against tonsil operations in singers, such evidence is intensely vague, uncertain, and, seems, after all, to be based mainly on hearsay.

Question 9. To what circumstance or technical fault do you attribute this destruction? There seems to be a unanimity of opinion that faulty

technic is at the bottom of any post-operative difficulty. The phrase "faulty technic," occurs again and again, while injury to the pillars, laceration of the uvula and soft palate, too extensive cutting or tearing of parts adjacent to the tonsil, and ignorance of anatomy and function of the tonsil are other ways the reports have of describing the causes of vocal impairment as they view it. A certain physician complains of those "who operate without anesthetics in sensitive throats which patients cannot control during operation." Surely, anyone who attempts, without anesthesia, any kind of operation on a highly strung supersensitive singer is guilty of a serious offense.

To Singing Teachers.

Thus far we have considered only the reports coming out of the experience of the laryngologist. Let us now take up the replies to the questionnaire set for singing teachers only. There was a great deal of difficulty in reaching the teachers, because their national organization has few members and no complete list of names and addresses. A large number of those addressed replied, but the writer regrets that he was unable to secure a longer list.

Question 1. How do diseased or enlarged tonsils affect the singing voice? The general opinion among singing teachers is that the tonsils muffle or deaden the voice, take up space needed for perfect vocalization, interfere decidedly with amplification of tone, make the voice thick and throaty and limit its compass, diminish the pharyngeal and nasopharyngeal (head) resonance, affect the general

health, cause liability to colds and weak throat, and prevent the expansion of the throat necessary for high voice.

Question 2. How many of your pupils approximately have had their tonsils removed? About ten to twenty per cent of vocal students sometime in their career undergo tonsil operations. One teacher says that a large percentage of so-called throat trouble is caused by diseased tonsils, and recommends all such people to undergo the operation before beginning vocal work.

Question 3. Was the removal total or partial? The consensus is that total removal is preferable; for, after partial removal "the tonsils grew again" and the pupil went through the same series of "sore throats every few days" as before. One teacher says that the question of total or partial removal depended, in his experience, on the skill of the operator.

Question 4. Was there any kind of bad effect on the singing voice? If so, how manifested? Nearly all of the reporters say that no bad effect was noted. One teacher found it "hard to bring into the voice any softness of color." Another thinks the operation does not benefit "since it makes the focusing of tone impossible." "Natural conditions are changed," says one, and fine adjustment of the pharynx is interfered with. In some cases the voice was lowered; in others, heightened from a half to a full tone. In at least one case lack of resonance was complained of, and in another the voice was weak and there was difficulty in focusing and holding the pitch.

Question 5. Do you know of any case in which

the singing voice was apparently destroyed by tonsil operation? (If so, a detailed report would be most acceptable.) The majority of reporters answered "No," emphatically. One voice was damaged (not lost) "by cutting a pillar of the fauces." Another teacher complains of the "careless cutting of ligaments" but does not say what was the result to the voice. Still another teacher finds that "in all cases emptiness of tone was the result, and in many cases the tonsils grew again, causing more operations." One reporter calls attention to the alleged fact that Campanini never sang after the removal of his tonsils.

Question 6. What percentage of good results have you found? Fourteen teachers have seen 100 per cent of good results; a few, only 50 per cent. Some found no effect, good or bad, and one thinks the operation "helpful in some cases, harmful in others." At least one is enthusiastic about results, and would have every pupil operated upon regardless of the indications.

Everywhere throughout the long list of answers there is evidence of an ignorance which ought not to exist. The vocal teacher is often out of sympathy with the laryngologist, and the laryngologist quite as surely fails to understand what the teacher is driving at.

For example: "In all my work as a teacher I have never had to send a pupil to a throat specialist. The tonsils, if there has been any difficulty, have, through correct use of the throat, voice and breathing with the aid of proper systemic remedies, gone back to natural, normal size, etc."

By contrast, a Chicago teacher writes: "If more

singers would consult a skilled throat specialist, we should have more real singers. No matter how perfect the method, it does not count unless throat and nose conditions are normal." Another thinks that "bad tonsils can be corrected by proper habits as applied to food, air, breathing exercises and sleep. They are indications of a poisoned system. Removal does not touch the cause." In a personal letter, a physician writes his opinion that "much tonsil trouble is caused by bad teaching."

In my own experience twenty-five singers have been tonsillectomized with uniformly good results. That is, the range has been improved a half to a full tone, and there has been no difficulty in adjusting voice placement to new conditions. Vocal power and resonance have both been increased. In one case, that of a large man, hemorrhage occurred four hours after operation. This was controlled by grasping the bleeding point with a special kind of artery clamp, and recovery was uneventful. There was no contraction of the fauces in this case, and his teacher declared that the improvement in vocal work was very noticeable. However, in one baritone whose course of healing was complicated by an infection of unknown origin, there seemed to be a greater tendency to attacks of acute bronchitis. Whether this was really so I cannot say as it was necessary to rely on the testimony of an extremely introspective patient who magnified his ills whenever possible. Nevertheless, in spite of this apparently untoward result, he was glad he had gone through the operation, and his vocal range and power were undoubtedly increased thereby.

In certain selected cases it is probably better to

temporize than to operate. Every specialist of experience will know and recognize the considerations which afford a basis for this judgment. Occasionally, it is better to do a tonsillotomy (partial removal) previously as mentioned. This statement will be a shock to certain confrères I know, but I think it is true in certain selected patients, nevertheless. As a rule, complete enucleation should be done. Undoubtedly, the small, "cheesy" tonsils should be removed *en masse,* as nothing is to be gained by simply puttering with them. The sooner they are out the better.

The late Dr. G. Hudson Makuen, of Philadelphia, whose work on voice and speech defects is known the world over, wrote me "it is safe to say that no tonsillectomy has ever injured the voice when the operation was really indicated and properly performed, but that many cases have been injured by ill-advised and careless operations I have no doubt whatsoever."

Dr. Solis Cohen of Philadelphia, thinks that "where hypertrophied tonsils impair the voice, improvement should follow operation. Where the contour of the tonsil is essential to the timbre of the voice, interference will impair it.

Finally, Dr. Justus Matthews, formerly of the Mayo Clinic, Rochester, Minnesota, who has performed an enormous number of tonsil operations, answered the questionnaire and added the following opinion: "I believe that most of the cases of loss of singing voice following tonsil operation are purely imaginary and are due to some other cause. However, I have seen several cases and feel certain that the cause is to be found in the cutting of the nerves."

Summary and Conclusions:

An analysis of 5,000 tonsil operations in singers show that in the hands of skilled operators there need be no fear of bad results.

It is the consensus of opinion that bad results are most often due to cicatrical contractions occurring from careless dissection or from neglected after treatment.

Pain in the tonsillar region, neck, and larynx after operation is probably due to division of some of the larger branches of the glossophyngeal nerve (9th cranial) (Justus Matthews).

Loss of singing voice after tonsillectomy might be due to nerve lesion, but is probably due to adhesions and scar formations in the fauces.

Loss of singing voice occurs very rarely after tonsillectomy. Impaired voice is possible, but most cases show an increased range of from one-half to a full tone.

The singer's problem is a very special one, and no laryngologist should undertake to operate on these patients unless he has some knowledge of the art of singing.

At operation the greatest care and skill must be exercised in securing a clean, free dissection. Injury to the tissues surrounding the tonsil may prove disastrous.

Post-operative care is of special importance. The patient should be seen daily until full healing occurs.

To sum up: Not every tonsil should be removed. The normal organ should be let alone. The diseased tonsil, or the abnormally large tonsil, should be removed, not by slicing off a piece but by thorough

dissection, shelling it out of its bed. In skilled hands there is practically no danger, and the good results which are likely to follow far outweigh any other consideration.

There are in the last analysis only two chief reasons for removing the tonsils: first, when they are so enlarged that they interfere with speaking or swallowing; second, when they are diseased, regardless of size. The greatly enlarged tonsil is not in most cases dangerous,—it is merely a nuisance, a mechanical obstruction in the throat; but the diseased tonsil, on the other hand, is a menace to good health, and may be the remote cause of untimely death.

CHAPTER XV

HAY FEVER OR POLLINOSIS

For many years hay fever has been one of the mysteries of medicine. The causes ascribed have been so many and varied that its true nature has been unnecessarily obscured. Recently, however, the American Hay Fever Association, an organization composed chiefly of sufferers from this malady, has done much to clear up this obscurity, and has very definitely determined that the condition is to a very great extent preventable.

The phrase "hay fever" is a misnomer; for hay is in reality seldom responsible for the well-known symptoms, and fever, when present, is usually due to some complication caused by bacteria. A much better name is provided by the word "pollinosis," which identifies pollen as the active agent. Practically all of the plants responsible are pollinated weeds, such as the cockle burr, Johnson grass, yellow dock, ragweed and goldenrod. Dr. W. Scheppegrell, of New Orleans, does not think that goldenrod should be classed with the hay-fever producing plants.

It must be remembered, though, that pollen is not the only cause; for in some people it has been determined, by testing the skin, that such substances as dog hair, horse dandruff, parrot feathers, etc., cause a reaction in the respiratory mucous membrane so

severe as to bring on an attack simulating hay fever, or an actual paroxysm of asthma. Certain foods, such as meat and eggs, are capable of producing such reactions in susceptible persons, and, therefore, the treatment of a given case must be preceded by exhaustive study in order to make an accurate diagnosis.

Not infrequently, asthma is associated with hay fever. An acquaintance related to me a most unusual case of the combined condition, occurring in his practice, where all efforts to find a cause had failed. The woman in question had been tested not only for all the most likely pollens, but for corn, wheat, beef, etc., on the supposition that something in the dietary might be uncovered as the causative agent, but all to no purpose. Finally, some astute person thought of the pet parrot in this connection; accordingly, a protein test of the feathers was made and applied to the skin of the patient, when, to the surprise of everyone, an enormous reaction took place, thereby proving the etiology. Much to the lady's regret the parrot was disposed of, but the end justified the means—she was promptly cured.

Numerous investigators have observed that there is an apparent relationship between the flowering of certain plants and the periodic annual coughing and sneezing which, in certain persons, occurs regularly at the same season of each year. Since that time it has been definitely proven that the pollen of certain weeds and flowers may produce symptoms in susceptible people. Dr. J. S. Goodale, of Boston, and others began to make emulsions and solutions of pollens of various plants, and to test the sensi-

tiveness of hay fever subjects to each variety. Dr. Goodale made several scratches in different areas of the skin of the forearm, and into each of them he put a drop of the extract of various pollens. It was surprising to see that some persons were susceptible to ragweed only, others to goldenrod only, still others to yellow dock, etc. When the skin reacted to the pollen, a welt or wheal would rise around the inoculated area, while other areas would be negative by comparison.

In this there is a curious resemblance to the action of poison ivy, which causes a most distressing itching and burning in some persons, even if they merely walk where the wind can carry the pollen in their direction; while other persons can pull it up by the roots and even smear it over the face with impunity. Some persons are, therefore, very definitely immune to these agencies; others extremely susceptible.

When pollen lodges on the mucous membrane of the nose, it sets up a local irritation, as evidenced by sneezing, watery nose and coughing. The poisonous (toxic) principles—foreign proteins, as they are called—are absorbed through the mucous membrane into the blood. If now the patient has a resisting substance in his blood, or if his blood can manufacture such a resisting substance, the pollen toxin will be neutralized and no constitutional symptoms will result. Again, if the absorbed toxins cannot be thus neutralized, then they are carried through the entire system and are probably excreted and reabsorbed from the nasal mucous membrane, thus repeating a vicious cycle. In the administration of pollen vaccine, an attempt is made

to introduce a resisting substance into the blood of the sufferer, so that the foreign proteins absorbed into the blood from the air tract will be neutralized.

When there is an abundance of pollen in the air, all persons breathing this air inhale about an equal amount, but only those have symptoms of pollinosis who are unable to neutralize the amount present on the nasal mucous membrane, and such quantity as penetrates through this membrane to the blood stream.

I recall an instance at a summer hotel, where I chanced to be house physician a few years ago, which is rather interesting. One of the lady guests came to me complaining of watery nose and eyes, itching and burning, sneezing and stuffiness,—that is, she had all the well-known and distressing symptoms of a violent hay fever reaction. In earlier life she had been disturbed annually by this peculiar syndrome, but for some fifteen years had been quite free of the malady and regarded herself as cured. We all were naturally at a loss to account for the phenomenon, when it suddenly came into my mind that the young people had decorated the hotel public room with flowers, twigs, leaves, etc., to make a holiday celebration. Fortunately, the affair was soon over, the decorations were promptly taken down, and the lady's symptoms disappeared almost immediately.

The effect of pollinosis on the singer incapacitates him completely for a number of weeks. The autumnal type of the disease is especially pernicious, since the symptoms are most distressing just at the opening of the musical season. Stuffiness of the nose decreases head resonance, and the dripping of

the secretion from above affects the larynx adversely. When absorption of pollen toxins into the blood is very considerable, depression and lassitude make any kind of effort extremely irksome.

As to treatment by a specialist, it is important that the nose be freed of all growths and redundancies, and that nasal breathing be effectively secured by operation if necessary.

Recently a surgeon in Fresno, California, whose name just escapes me, wrote a very readable and interesting report of his experience in the use of 95 per cent alcohol. The nose is slightly anesthetized and the alcohol injected into both inferior turbinates. The procedure is extremely simple, and its sponsor claims about 90 per cent of cures with it. No explanation of the *modus operandi* by which such brilliant results are obtained is forthcoming, and the treatment is, thus far, purely empirical.

Along with the stuffiness, sneezing, etc., there is not infrequently an associated difficulty in the resonating cavities, or nasal sinuses, causing an outflow of yellow discharge, and, as a rule, there is also enlargement of the so-called turbinate or scroll-like bodies, the primary purpose of which is to warm and moisten the entering air. A crooked nasal partition, or diseased tonsils or adenoids, must be corrected in order that the entire upper respiratory tract be put in the best possible physiological condition to make subsequent treatment effective.

One must aim to keep the patient in an atmosphere as free as possible from pollen, dust, and all other air-borne irritants. This measure, of course, will not relieve those suffering from a food-protein type of the condition, which is, after all, probably

not so common as the flowering pollinating variety. A prolonged sea voyage, or a protracted residence in the mountains during the pollinating season, are very helpful in attaining this end. The first prescription is to cut all weeds and pollinating plants, or, better still, pull them up by the roots.

New Orleans has succeeded in passing an ordinance against flowering weeds and plants which is strictly enforced. The results, thus far, have surpassed all expectations. In the eradication of pollen-bearing weeds, it is important to know how far one may expect the pollen to be active. By means of glass slides exposed to the wind, it has been found that some pollens travel a very considerable distance, even several miles. Owing to wide distribution and dissemination by the wind, the potency of pollen is greatly decreased, this decrease being estimated to be "inversely as the square of the distance." For this reason pollen is not often capable of producing pollinosis at a distance of more than half a mile. According to this rule a patient at 1,000 feet, or about three ordinary city blocks, would inhale only 1/1000 part of the pollen to which he would be exposed at 100 feet.

Recently a drug known as calcium chloride has proven effectual in some cases. This has been of value in various types of asthma as well, and is supposed to benefit by its sedative action on the nervous system. It is not ulikely that it acts as an "antibody" against the foreign proteins and disease germs which gain entrance through the debilitated nasal mucous membrane.

So-called "hay-fever vaccine" is now prepared by

manufacturing chemists and biologic laboratories for physicians' use. Hypodermic injections are given in graduated strengths at least thirty days before the expected attack, and continued at five-day intervals. When relief is secured, one weekly injection during the pollinating season may be sufficient to establish complete immunity. There are no contraindications to the preventative or curative use of this form of treatment, but experience is required for the adjustment of dosage to the individual case. Commercial vaccines used in the autumnal type of pollinosis contain protein extract from the pollen of ragweed, maize and goldenrod, dissolved in physiologic salt solution and accurately standardized. When relief is not prompt, the patient is probably susceptible to some pollen not contained in the vaccine. In such cases tests must be made to determine which pollen is causing the continued symptoms. A special vaccine can be prepared then, including a suspension of this pollen extract.

The control of the "hay-fever malady" is just at hand. What has been set down here represents the latest advances in the study of causation and treatment. The stigma which the medical profession has been obliged to bear for so many years, because of its inability to afford marked and permanent relief, is now removed. Thus has the conquest of disease continued slowly, very slowly but surely, throughout the ages. Man is at last coming into control of those unseen and unknown enemies which have made life almost unendurable, or have decimated and depopulated human habitations from

valley to mountain peak. In this twentieth century a great war is being waged against disease, a war more successful, farther reaching, than any yet known; but the fruits thereof are not to be fully appreciated and enjoyed for some years to come.

CHAPTER XVI

MANAGEMENT OF ACUTE INFECTIONS OF THE AIRWAYS

It is going to be recognized more and more that the majority of acute infectious diseases find a site of origin somewhere along the tortuous path of the airways. Recent studies of "carriers" have shown that a great number of people in a fair state of health are harboring in their systems enormous numbers of pathogenic bacteria which are capable of starting a new and severe infection when transferred through ordinary contacts of social customs to new and favorable soil. The diphtheria bacillus, the bacillus typhosus, the pneumococcus, streptococcus, meningococcus and many others may exist in the nose and throat without giving any signs of their presence. Physicians and nurses in the wards of hospitals frequently carry all of these bacteria at various times in their airways, but go about their work unconscious of any danger to themselves or their charges. Such are for the most part temporary carriers and, once they are away from the contagious atmosphere or source of supply for a few days, the bacteria are no longer to be found.

The most dangerous type are the latent or unknown carriers which, while not giving any evidence of disease themselves, are capable of transmitting it to others in virulent form. An acute carrier is one who has recovered from an attack of a disease

and who through convalescence and for a few days thereafter shows the organisms to be still present. If the bacteria persist in the cultures taken for some months or years, the infected person is said to be a "chronic carrier." The study of carriers in the war period has shed new light on the spread of communicable disease, and has emphasized the necessity of taking at least two negative cultures from all cases before discharging them from quarantine.

The difficulty of sterilizing any mucous membrane tract after infection is obvious, but it must be done if public health is to be safeguarded, and the newer science of medicine must see that it is done. This is especially true regarding the so-called "missed" case where the patient suffers only a slight indisposition and no one thinks it worth while to examine the discharges bacteriologically.

The experience of Great Britain in the outbreak of cerebrospinal meningitis in the camps during the war has been of great help in working out the problem of the carrier in this country. The findings of the British Commission which studied this matter exhaustively have been of aid to us in studying our own epidemics. It is too extensive to be more than mentioned, but will well repay a careful reading. This commission came to the conclusion that every case of cerebrospinal fever was an instance of an overlooked carrier. When a man reported sick, cultures from the nasopharynx enabled one to make a positive diagnosis within forty-eight hours. This only emphasizes once more how important the respiratory tract is in giving origin to many hitherto obscure diseases. Research workers

on the higher animals (anthropoid apes) are assembling a mass of evidence showing how frequently the portal of entry is in the nose and throat. It is thus that meningitis has been studied, the meningo-coccus isolated from the naso-pharynx, and a serviceable serum invented to overcome the ravages of this dreaded disease.

In reality the exanthemata are all examples of acute local infections of the nose and throat which quickly become generalized and offer the well-known signs which lead to a diagnosis of constitutional disorder. Of these scarlet fever is the type, and it would seem that very much could be done to shorten the course of this infection and prevent imminent and dangerous complications by cutting off the supply of the infective agent in the nose and throat. The respiratory tract has always been gravely concerned in such diseases as measles, diphtheria, whooping cough and parotitis, but it would seem that no concerted effort has been made to attack these from the nose and throat viewpoint. Tuberculosis is doubtless in many instances an inhaled infection, although primary tuberculosis of the upper air tract is looked upon as a rarity. The bacillus of leprosy has frequently been found in the nasal secretions, and its incidence in the upper air tract has been the cause of heated discussion in various learned societies from time to time.

We need to know a great deal more than we do at present about the causes of diminished resistance to disease. Exposure to cold, wet and fatigue have been often set down as predisposing causes, but no one has explained the mechanism of their working. Acidosis has been receiving some attention of late

as favoring the action of bacteria in the system, and it has been rather a constant factor in the influenza epidemics,—so much so that the use of acid fruits to form tartrates, malates, etc., has been strongly indicated, and the exhibition of such drugs as sodium citrate in large doses has had enthusiastic supporters.

Students of metabolism are laying great stress upon imbalance of the endocrines as a cause of lessened resistance. After acute infections, the adrenal glands are supposed to function less efficiently; therefore, fatigue, headache, malaise, loss of appetite, etc. The pituitary, the thyroid, and the sex glands may all be involved, and it may be necessary to feed extracts of these glands to a patient before any considerable degree of immunity can be established. This is possibly one reason why we sometimes fail in our use of vaccines,—the endocrine balance must be restored first before the body resistance can be improved. The subject is very fascinating, but to date it is highly speculative, and hardly, as yet, established on a sound, scientific basis.

The principles of treatment in every acute respiratory infection are as follows: (1) A culture should be taken on nutrient or blood agar. (2) The nose should be opened by means of astringents. (3) From a pint to a quart of irrigating fluid (normal saline) should be applied at stated intervals. (4) A sufficient quantity of a non-irritating antiseptic should be dropped or sprayed on the diseased surface to kill as many of the specific bacteria as possible. (5) This procedure should be repeated twice a day or oftener if the need be urgent.

These principles vary in detail only according as one is working with the nose, pharynx, larynx, trachea or bronchi. As to the culture, one must be sure that no antiseptic has been applied for at least three hours preceding the taking. Irrigation may be carried out by a process of combined irrigation and suction as exemplified in the Nichols' nasal syphon. This the patient can learn to use at home, and it seems safer with respect to the ears than any other method. But one must remember that the ears may be invaded nevertheless, and all blowing of the nose after this suction treatment must be interdicted.

The successful use of respiratory antiseptics is based upon the following protocols: (1) The antiseptic must be sufficiently lethal for the bacteria with which we have to deal in a given instance. (2) The antiseptic must not injure the mucous membrane either through its chemical or mechanical action. (3) There must be thorough contact with all infected areas, and care must be taken to see that the antiseptic action be not vitiated through dilution by the normal secretions. (4) Concentration of the antiseptic must be sufficient but not excessive in amount. (5) All conditions necessary to thorough bactericidal effect must be maintained for a sufficient length of time. Some commonly used antiseptics are argyrol 5 to 10 per cent; silvol 5 per cent; and silver nitrate 2 per cent in a De Vilbiss atomizer No. 52, fitted with a hard rubber bottle-stem. Personally, I use silver nitrate much and believe it to be one of the best remedies for mucous membranes which we have, but only when wisely used. Menthol in oil, 5 to 25 per cent, is

excellent in acute laryngitis, if dropped (one-half to one cc.) directly into the larynx. For the larynx, trachea and bronchi, an excellent remedy is 2 per cent guaiacol in liquid petrolatum. About one-half to one cubic centimeter can be dropped directly into the trachea. Recently, two authors have published experiments on animals which seem to prove that oil when thus introduced into the trachea may be dangerous, even causing pneumonia. They used, however, several cc. in these experiments. After 15 years experience with sterile oily suspensions, I have never seen anything but good follow their use if not more than one cc. be used. Much of the oil is promptly coughed out and in this way spreads over a large area, thus disinfecting places reached only with difficulty by other means.

My method of procedure in the treatment of singers or other patients who come in with an acute diffuse infection of the respiratory tract which bears the time-honored name of a "cold" regardless of the causative agent is as follows:

1. Get the nose open.

2. Irrigate with warm normal saline, at least 1 pint.

3. Spray in silver nitrate 1 to 2 per cent, just enough to get a fine white layer of albumenized silver over the entire nasal mucosa, even up under the middle turbinate. Turning the tip up, an application is also blown into the post-nasal space.

4. Protect with Chloretone or any other pleasing antiseptic.

5. For further soothing effect, one may use the old formula of the late Prof. O. B. Douglass:

℞

Thymol	grs.	x
Eucalyptol	grs.	xx
Menthol	grs.	xxx
Oil of Cubebs	℥	ss.
Benzoinol	℥	ii
Oil Rose		q. s.

Sig. Spray nose with oil atomizer as directed.

The patient is given full instructions as to home treatment. If there is a good deal of stuffiness, I order the following:

℞

Adrenalin (1–1000)	m.	xxx
Liquor Antisepticus Alk.		—
Aquæ	aa	℥ i

Sig. Spray nose as directed.

At the same time I order a De Vilbiss atomizer, No. 16. This has two bottles, in one of which is placed the above, and in the other any good oily antiseptic,—the solution is to be followed by the oily suspension. Sometimes I also order one of the less-irritating silver salts, most of which are proprietary and by many considered to be unethical, but again we must remember that only results count and we must put aside our prejudices.

The method of washing out the nose at home is explained as follows to the patient: Procure an ordinary glass medicine dropper. Remove the rubber cap. Then attach this glass tip to the rubber tubing on any ordinary douche bag. Most douche bags sold in drug stores hold two quarts and are furnished with various hard rubber tips which need

not be considered here. Of course, some kind of a check should be on the tube so that it can be cut off when necessary. If there is much crusting, I order the patient to use one quart of warm water about body temperature, two level teaspoonfuls of common table salt and two level teaspoonfuls of sodium bicarbonate. This is stirred up and poured into the douche bag. The bag is then hung about 18 inches above the head with the patient in the position that he intends to assume during the irrigation. The head should be inclined forward at an angle of 45 degrees, and the glass tip or nozzle directed upper and backward so that the water will flow freely through one side of the nose and out of the other. The advantage here is that the nose is not blocked up by any tight fitting hard rubber or other tip. This I regard as one of the chief causes of water going into the ears. Where suction is used, complete closure is absolutely necessary, but where irrigation only is employed, the above described method is the most satisfactory. This hot douching is especially beneficial in acute inflammations of the nasal sinuses and may be carried out every two or three hours during the day. Again, it is necessary to warn against blowing the nose, and any fluid left behind should be drawn back into the naso-pharynx and expectorated.

Home treatment of the larynx and lower airways is less satisfactory. For self-medication, Dr. Yankauer of New York City has invented a very large medicine dropper which the patient takes into his mouth, and then, while inhaling, squeezes the rubber bulb and throws the medication downward into the trachea. If this seems desirable in case the

patient is going out of town on a journey, or for any other good reason, the guaiacol suspension mentioned above can be used in this Yankauer pipette.

One may also recommend the compound tincture of benzoin which had such a vogue among practitioners of other days, and is still widely prescribed. I prefer to add about 20 grains of menthol to each ounce of the benzoin, and have the patient use a teaspoonful to a pint of boiling water three or four times a day. The water must be boiling hot so that the steam comes off freely. The patient may make a funnel out of an old newspaper, and, putting the large end over a pitcher, he should inhale from the small end, breathing deeply through the mouth and blowing out through the nose. It is not absolutely necessary to make a fresh solution each time. One may boil it again, remembering that it boils over very quickly, and, if on a gas stove may put out the gas, causing danger if neglected.

Constitutional reaction to local infection should be treated symptomatically. A prescription which I use much is

Acetphenetidin	grs. v
Salol	grs. iii
Ext. Aconiti	gr. 1/6
Caff. Cit	gr. ss.

M., Sig. Make into powders or caps. and take one every 3 or 4 hours.

Instead of the above, one may use 10 grains of aspirin every two or three hours until free perspiration is secured, or the salicylates alone or in combination with other drugs. In many patients who

are susceptible to infections of the airways, there is said to be an acidosis of the system; it is, therefore, in order to administer alkalies. There are good alkaline waters on the market which are refreshing and palatable such as the Vichy Celestins or French Vichy, as it is known, and Kalak Water which is made in this country. In this connection, lemons have their uses, taken either in the form of lemonade or as one may wish. The acid juices are changed in the blood into alkalines,—the malates, tartrates, citrates, etc. In any case, much fluid should be taken, five or six quarts in the 24 hr. period, and very little food. A "starvation diet" is the best kind. Rest in bed has been very widely emphasized and if the patient has a temperature of 100 degrees Fahrenheit or more he should not be allowed out of the house. It then becomes necessary to treat him at home. Many ear, nose and throat specialists do not like to do bedside work, but there is sometimes great necessity for it, and we ought, undoubtedly, to do a certain amount of it. Special equipment is required, but in houses where there is no electricity one cannot do justice to the patient. The essentials of the equipment are: I. A pump or blower for spraying solutions. II. Four spray bottles. The first should contain an alkaline mixture with perhaps a little cocaine 1 to 2 per cent with adrenalin. The second should be one of the silver salts such as silvol or argyrol or collene. The third bottle should contain 1 or 2 per cent silver nitrate solution, and the fourth an oil spray, guaiacol 2 per cent or any other oily antiseptic most favored by the practitioner. III. A glass laryngeal syringe and laryngeal mirror. IV. Hays' headlight.

This is a little storage battery light which is attached to a headband, and gives satisfactory illumination if one makes sure that the battery is fresh. V. Applicators upon which to wind cotton. These may be of metal or wood as one prefers. Along with them should be a bottle of adrenalin and some cocaine crystals. VI. A nasal speculum, preferably one with a solid blade, Vienna model, and tongue depressors, wooden and metal. The metal spatula is especially desirable for examination of cases of stiff jaw or tongue, or where the mouth cannot be widely opened as in peritonsillar abscess. If there is no general practitioner in attendance, and one cannot be readily consulted, it is the duty of the throat specialist to examine the patient's chest with the idea of differentiating a bronchitis from a pneumonia. It is always wise to call in a general practitioner in every case to share the responsibility. The nose and throat specialist in these latter days is widening his field more and more, but he must respect his limitations and not encroach upon the field of the general practitioner more than is absolutely necessary.

CHAPTER XVII

MANAGEMENT OF CHRONIC INFECTIONS OF THE LOWER AIRWAYS*

Any person who has more than a passing interest in respiratory diseases must have been impressed in an increasing degree by the large number of so-called chronic conditions of the larynx, trachea, and lungs which are met with not only in daily clinical experience, but outside of the consultation room and hospital ward. Many cases at one time acute, are now chronic because of neglect or improper or unskillful treatment and have gone on to such marked pathological change that they go about seeking relief where none is found and become the bane of many a practitioner.

It should be understood that I am speaking here of infectious processes only and not of conditions the result of tumor, such as aneurysm, or the chronic passive congestion of valvular heart disease, or structural changes found in such incurable entities as emphysema and advanced tuberculosis.

There is undoubtedly a rather large group of patients who are suffering from an unrecognized infection of the respiratory mucous membrane, not merely a surface infection, but an infection where the bacteria live, thrive, and grow deep down in the

* Published in *Acta-Laryngologica*, Vol. IV, Fasc. 4, Stockholm, Sweden, 1922.

submucosa, causing there, in time, abundant connective tissue proliferation and complete functional change. Such patients are, in the light of present-day knowledge, carriers of certain types of micro-organisms attenuated in virulence, to be sure, but culturable on satisfactory media, again becoming lethal when used experimentally. It is remarkable how resistant the body becomes to the ulterior effects of such a chronic infective process, and even a superadded acute infection such as that caused by the pneumococcus does not always destroy the life of the patient, contrary to what might be expected. Many such cases recover from the acute process only to have for the remainder of their lives the annoying symptoms of an old chronic condition.

Our profession at large has been slow to learn the nature of infection of the respiratory mucous membrane save in pneumonia and tuberculosis which have been studied assiduously. A sputum is sent to a health laboratory for examination, the specimen is reported as containing or not containing the tubercle bacillus although it may have swarmed with myriads of other organisms which are regarded as simply incidental—a "mixed infection," if anything is said about it at all. The pneumococcus, for instance, is recognized as a potent enemy, but it is only within a very short time and as a result of academic rather than actual clinical interest at the Rockefeller Institute that the pneumococci have been classified into four distinct groups according to their virulence and prognostic importance. It is now known that every case of pneumonia falls under one of the four headings according to what the laboratory specialist has to say about the

sputum; and, consequently, we have had placed in our hands a specific serum for each type according to the identity of the enemy we are fighting. Work of this kind is not only far-reaching but epoch-making in that it gives us a wider acquaintance with our bacterial enemies, and affords a constructive plan of battle out of which we have greater reason to expect victory than ever before.

Without meaning to offer any drastic criticism it is only fair to say that no class of disease is more unskillfully treated by the average medical man than infections of the lower respiratory tract, and especially so if they be chronic. Fortunately the acute cases have a remarkable tendency to recover whether they be accorded all, any, or no treatment whatever, and it is undoubtedly due to this fact that the family practitioner makes light of a simple "cold" and considers his duty well performed if he prescribes almost anything that comes to his mind just to make the patient feel that something is being done. This is, in the last analysis, the fault not of the doctor but of medical teaching. In all diseases of the lower respiratory tract *indirect* treatment has ever been the rule. Too much attention has been paid to the bowels, the liver and kidneys, to the temperature, pulse and respiration, to calomel, squills, ammonium chloride, ipecac, rhinitis tablets and the compound tincture of benzoin; and not enough attention, may one say no attention at all, to the microorganisms causing the difficulty and how they may be combated.

It has not been emphasized that cough medicines do not cure but only increase or diminish the secretions and stop the tickling through the beneficial ac-

tion of some paralyzant such as heroin, which constipates and may set the stage for the entrance of that arch villian, Opium, who has probably destroyed more lives than he has ever saved.

A primary requisite is to have the hearty cooperation of a skilled laboratory worker, preferably an able bacteriologist, who must be interested in the clinical side of his work as well as in the test tube and microscope. In every case the sputum should be obtained, and cultures taken from the nose and throat if secretion is available. It should be a standing order that the culture is to be saved with the purpose of making a vaccine if this be deemed necessary.

The organisms most commonly found are some member of the streptococcus or staphylococcus family, the pneumococcus and the micrococcus catarrhalis. Some attempt should be made to determine the site of bacterial growth. Not infrequently the voice is normal and the larynx looks healthy, but just below the vocal cords the mucous membrane looks swollen and red and the tracheal rings cannot be counted. This, of course, means that a tracheitis is present and the patient when asked where he feels the tickling will point to the episternal notch, to the area "directly behind the collar button." Plaques of mucopus, mucus, and blood streaks are often seen, especially when the streptococcus mucous is present. A continuous desire to scrape the throat indicates the presences of mucus on the vocal cords, and not infrequently the patient cannot speak distinctly until this mucus is shaken off by the scraping or "hemming" process.

In chronic tracheitis one often finds the mucous

membrane over both true and false cords covered with crusts. The interarytenoid area is usually so covered. There is a dry, hard cough which becomes easier when the crusts soften and can be coughed out. The secretion in all of these cases is very viscid in character owing to an excess of mucin, consequently when dried it becomes very firmly attached to the epithelium and on coming away leaves a raw, bleeding, eroded surface. The voice is very husky, and at times there is aphonia. Owing to increased connective tissue proliferation, the mucous glands are few in number and function abnormally so that the mucous membrane surface looks dry and glazed. Such a condition may be limited to the trachea or may extend downward into the larger bronchi. In one case, upon examination of the right superior bronchus with the bronchoscope, we entered a small abscess cavity which had apparently been encapsulated. Culture showed a staphylococcus organism.

In those cases of so-called chronic bronchitis with copious, fetid discharge, one must always keep in mind the possibility of a foreign body in a bronchus. One such patient, the son of the president of a great mercantile company, had been the rounds in Europe before the great war, and a diagnosis of pulmonary tuberculosis had been made by several eminent physicians. An X-ray plate showed an encysted collar button far down in the right bronchus which had been there for about eleven years. This was successfully removed by Dr. Chevalier Jackson, then of Pittsburgh, and the patient recovered, although it rquired several months for all of the active symptoms to subside. This is by no means unique, as

several bronchoscopists have reported similar experiences.

The method of procedure in all cases is as follows: A careful history, especially as to how the condition began; its probable origin; whether following pneumonia, grippe, etc.; question of associated disease, heart, kidneys; duration; local symptoms; character of cough, worse at night or when lying down; what periods of ease if any; effect of climatic or barometric factors; amount, character, odor, color, and consistency of sputum; and the kinds of treatment that have been already employed.

In the local examination the nose and nasopharynx must be studied for obstruction and the presence of pus. Occasionally the patient complains of coughing and gagging, which we find to be the result of a chronic nasal sinus disease with postnasal discharge and dried secretion which gets down into the hypopharynx, drags on the epiglottis and rima glottidis, and sets up severe spasms of choking until the offending discharge is loosened and spit out. The larynx and trachea must be studied with the laryngeal mirror, and it is often necessary to cocainize quite thoroughly with ten or twenty per cent cocaine before we can get a view of the region below the cords.[1] In case this indirect method fails, we can proceed with the direct speculum and inspect the trachea and bronchi by bronschoscopic methods. In every case a specimen of secretion must be secured, either during the examination or when the patient coughs it out. This is cultured and care-

[1] In a recent communication Dr. Chevalier Jackson writes that he no longer finds it necessary to anesthetize directly down into the larynx but that good insensibility can be obtained by applying the local anesthetic to the supralaryngeal region, so that the superior laryngeal nerves will be acted upon.

fully gone over by the laboratory man who furnishes a full report of the bacterial flora.

X-ray examination of the nasal sinuses and of the chest may be essential in a given case, and a Wassermann may throw surprising light on a baffling problem.

Physical signs afford some help as to the location of the lesion—that is, which lung and what part of the lung is affected. In our experience, however, physical signs, even when determined and recorded by an expert examiner, are not of nearly so much

Fig. 17.—Papilloma or wart-like growth between the cords having its attachment in the anterior commisure, and causing hoarseness with some difficulty of breathing.

value as the X-ray, although this latter is also capable of being misread.

Naturally the entire question of treatment resolves itself into two factors: the improvement of the patient's general resistance, and the destruction of the bacterial parasite. The former has been the chief weapon of the lung specialist these many years, and is too well known to need mention here. A newer phase of treatment which does require special mention is the use of vaccines. These have proved so successful in my hands in increasing the general bodily resistance that it is surprising how

many men seem opposed to their use. Where disappointment is experienced, there must be something in the way the vaccines are made which affects their efficiency. Personally, I use autogenous vaccines whenever possible. Dr. T. S. Schlauch, of New York City, has made these for me for some years and I cannot testify too strongly to their value. This excellence probably lies in the fact that he does not destroy the bacteria by heat in making the vaccine, but uses cresol or a very mild carbolic solution. Heating is capable of exerting some lipoid change which renders the vaccine inert or at least ineffectual, and it is entirely unnecessary. The vaccine is counted as 500 million in one cubic centimetre. We begin with fifty million in most cases and wait for the reaction, both local and general, to subside before giving another dose. Quite often one can increase a half c. c. at each dose. Whenever a too marked or violent reaction is obtained we usually discontinue vaccine treatment temporarily and watch for recurrence of old symptoms or absence of them as the case may be. A vaccine does two very helpful things, it increases the appetite and makes the patient sleepy, and is therefore a better tonic than most of the commonly used drug combinations.

If a drug combination seems desirable, the French ampoules of Clin & Cie. (No. 627) are excellent. These contain glycerophosphates of iron and soda, arseniate of soda, and sulphate of strychnine. One of these sterile ampoules is used hypodermatically twice a week, rarely three times. After the third dose the patient will often say that he feels much improved.

As for the destruction of the microorganisms by

direct treatment, this is a matter which has been sadly neglected. Even the nose and throat specialist has not always made the most of his opportunities in applying bactericidal medication, chiefly because most agents have acted severely on the normal body cells as well as on the bacteria, and thus the patient has been made worse instead of better. Silver nitrate has been the old standby, and when judiciously used it is very helpful. It should not be swabbed into the larynx with an applicator as that method is very disagreeable, and by bruising the soft tissues may engender a reaction which does more harm than good. With a De Vilbiss[1] atomizer (No. 52) it can be sprayed directly into the trachea, or if it is desirable to reach the bronchi it can be dropped in with a laryngeal syringe. A two per cent solution is sufficiently strong, about five minims at each instillation. Recently a proprietary combination known as *collene* has been put on the market and has the merit of being a "colloidal silver in permanent suspension" and does not stain handkerchiefs, towels or clothing. Occasionally where direct medication of a given bronchus has been desirable, we have passed the bronchoscope under local anesthesia and have instilled our antiseptic through a soft rubber catheter passed through the lumen of the bronchoscopic tube.

The silver preparations are especially helpful where one has to do with crusting, for they increase all secretions to a marked degree, render them less viscid, and by stimulating the mucous glands help to remove from the submucosa great masses of bacteria which have been intrenched there.

[1] These are made by the De Vilbiss Mfg. Co., Toledo, Ohio.

Much is to be looked for from the dichloramine-T of Carrel-Dakin. This is now made up with an oily base known as Chlorcosane and is fairly stable as compared with the earlier solutions which were readily spoiled by contamination and decomposed by light and had to be made up fresh every day. Either a one per cent or a two per cent solution may be used in the trachea and bronchi by instillation or spraying. It should not be used on normal mucous membrane in the nose as a violent reaction is induced which may last several days. In beginning treatment of those cases where there is much discharge or crusting it is better to use a silver preparation for a few days, and then change to dichloramine-T when one can be sure that this agent will come directly into contact with the infected surface.

One reason why treatment of this class of patients has failed in the past is because neither patient nor doctor has realized the importance of persistent and repeated applications of bactericidal agents. Inhalations such as the compound tincture of benzoin, while of value in certain acute cases, are not usually concentrated enough in action and not frequently enough applied. Bacteria grow at an enormous rate on the lower respiratory mucous membrane where heat, moisture, and absence of direct sunlight make cultural conditions ideal; therefore, ammunition must not be frugally used, but a nearly continuous barrage fire must be maintained to win the battle against such overwhelming propagation. It is useless to administer treatment by direct instillation and tell the patient to "come back the day after tomorrow," for by that time the effect of the bactericide has long since been lost. These patients must

be treated at least once every day. In private practice the effect is so marked that patients do not at all object to coming in morning and evening and thus shorten the time of convalescence very markedly. Twice a day is the rule in all severe, chronic cases and in all of the acute ones with active symptoms or tendency to complications in the ears and sinuses. The gratitude of these sufferers more than repays the physician for the time and patience he is obliged to give to them.

Conclusions.—From an intimate and intensive study of a number of cases of chronic, chiefly pyogenic, infections of the larynx, trachea, and bronchi, both in hospital and private practice, it would seem that such infections are seldom diagnosed in the acute stage. Questioned as to previous treatment, nearly all of these patients said that they had taken much medicine by mouth without seeing any permanent benefit, and that the activities of the physicians whom they had consulted were limited to chest examination, sputum tests, and a negative report as to the presence of pulmonary tuberculosis. In many cases, the patients had been carefully advised as to diet, fresh air, exercise, etc., but very few had received any kind of local treatment other than inhalations to be carried out at home, and an occasional swabbing of the pharynx and larynx with a silver or iodine preparation.

In the light of such evidence it would seem wise for those who make a specialty of throat and lung disease to enlighten the profession as to the method of procedure in the diagnosis and treatment of cases manifesting chronic hoarseness and disturbing

cough. Especial emphasis should be placed upon the importance of systematic and thorough treatment in all acute respiratory infections with a view to decreasing the number of chronic cases now so frequently seen in all branches of medical practice.

CHAPTER XVIII

FUNCTIONS OF THE DIAPHRAGM AND SOME NOTES ON THE PHYSIOLOGY OF BREATHING

Authorities on anatomy are pretty well agreed that the diaphragm is not merely a voluntary, but is also an involuntary muscle which separates the lungs from the stomach and intestines.

The partition serves a double purpose in acting as a floor to the chest and a roof to the abdomen. The diaphragm is attached at its circumference all round to the margins and upper borders of the cartilages of the lower six ribs, in front to the lower end of the breast bone or sternum, and behind to the spine by two strong muscular bands named "crura."

It will thus be seen that the diaphragm is attached to the rim of the lower outlet of the chest cavity.

The diaphragm is peculiar in having in its centre a tendinous expansion in the form of a clover leaf, hence named the trefoil. The three segments of the leaf are not of equal size. The largest is situated to the right, and rests upon the upper convex surface of the liver. The smallest is to the left, and rests upon the large end of the stomach.

The diaphragm is, to be sure, an important muscle of inspiration, but, from the singer's viewpoint, inspiration is the phase of minor value, the phase of

major value being expiration. The singing voice is produced during expiration, not necessarily by the letting free of a great volume of air, but by the control and regulation of, perhaps, only a tiny jet. This control comes not from the diaphragm alone, but from the entire respiratory group of muscles,—those between the ribs, in the abdominal wall, at the shoulder blades, in the neck, etc., so that, in the last analysis, we have not one muscle nor one group of muscles at work, but the entire body acting as a unit. It is not true that "By the action of the diaphragm the inhaling as well as exhaling is regulated";* for it is perfectly possible to have the diaphragm at rest, and yet breathing will go on just the same,—shallow breathing, not deep breathing, of course. The diaphragm is *not* a muscle of expiration. Breath control does not come only or even chiefly from the diaphragm, but from the central nervous system acting on the entire respiratory mechanism as a whole. The muscles of the abdominal and thoracic wall are all-important in the control of the voluntary expiratory act. Without good, solid, abdominal support, no singer can ever hope to obtain great effects in his work. It is very easy to confuse the action of the diaphragm with the action of the abdominal wall, for it seems quite impossible to work the one without the other. In any case the wise singer will do everything he can to increase his muscular power, and then make this power subservient to his will in every detail. The combination of strength and skill rightly proportioned spells success in many cases where either alone would mean only a poor mediocrity.

* Mr. Oscar Seagle in Musical Courier.

To understand how any organ of the body functions, it is necessary to go into the anatomy in some detail. It takes the medical student of average intelligence two years to learn the fundamental gross structure of the human body, and yet most patients insist on trying to find out from their medical adviser all there is to it in twenty minutes. It is difficult to learn vocal anatomy unless one has access to a dissecting room, and the supervision of a good teacher. All this is quite unnecessary for the vocal *pupil*, but it ought to be compulsory for the vocal *teacher* in order to establish a scientific groundwork. In this way many heated controversies might resolve spontaneously into a modicum of fact upon which all truth must ultimately be based. I should like to go into a description of the anatomy of the diaphragm, but it is impossible to do so here. Besides, this has been very well done by hundreds of writers on anatomy, notably, in English, by Gray and by Cunningham. These authors are recommended to anyone who wishes thoroughly to comprehend the subject insofar as reading can help him. It would then be in order to take down an up-to-date textbook on physiology and turn to the chapters of special interest to the student of voice and speech. No one who has not done at least this much is in any way entitled to an opinion on the vocal mechanism, let alone talking learnedly about "structure, form and function, resonators," et cetera.

The time has long since passed when a surgeon could buy a handful of instruments and begin his career by cutting into every organ that came under his watchful eye at the cost of the patient's life.

Likewise the time is rapidly passing when the singing teacher can carry on his occupation without a previous course of study. It is written in the stars that sometime in the not too distant future, the would-be teacher will be obliged to attend a school for two or more years in order to perfect himself in what ought to be a worthy profession instead of an unworthy trade. The State will demand a rigid examination in the anatomy and physiology of the voice, a knowledge of physics, especially "sound," the principles of phonetics, of "break in the voice," and, of course, a thorough test in the fundamentals of music, with, at least, some degree of proficiency in playing the piano or violin. Before anyone is allowed to teach singing it should be determined whether he has an accurate sense of pitch or not. There are plenty of indications which seem to show that many singing teachers have an imperfect idea of pitch, and I feel quite certain that at least one whom I chanced to meet was pitch deaf. How can anyone judge whether a tone is good or bad if he has no idea of its proper production?

Physiology of Breathing—Inspiration and Expiration. What bellows are to an organ, the lungs are to the human voice, with the additional function that they are a necessary mechanism for the exchange of air and the support of life. The lungs are, of course, primarily breathing organs which take in the air during inspiration, thus supplying oxygen to the tissues, and giving off, during expiration, waste products of the body. As regards the intake of air, the air spaces in the lungs are enlarged or decreased in size, according to the volume consumed. In spite of the increase and decrease in volume, the

lungs are, however, not active but passive organs of respiration. They are contained in the chest cavity in a vacuum, and rise and fall with the excursions of the chest movements occasioned by the accessory muscles of respiration.

The surface of the lungs and the inner wall of the chest are both covered by a moist membrane called the pleura or pleural membrane which allows uniform expansion at all points. Inspiration requires that the airways, nose, pharynx, larynx and trachea be open. The increase in chest space is brought about through contraction, retraction and sinking of the diaphragm, and widening of the spaces between the ribs. Expiration occurs when the inspiratory power reaches its height and the elasticity of the thorax itself begins to return to the condition assumed before the inspiration. Herein come into consideration the weight of the thorax, the elasticity of the ribs and rib cartilages, which upon relaxation of the diaphragm, bring back the abdominal walls into the resting position; so that, in quiet expiration, the active muscular strength is exerted when this quiet expiration can be voluntarily interrupted at any moment. It is assumed that the internal intercostal muscles are active also during quiet expiration. During forced expiration the abdominal muscles come into play, which, through their contraction, press against the diaphragm and produce the pressure upward against the ribs. The inferior serratus posticus muscle draws the four lower ribs downward, upon which movement the remaining ribs must follow this downward motion. The quadratus lumborum muscles are accessory in this movement. The remaining abdominal muscles narrow the ab-

dominal cavity both in the transverse and antero-posterior diameters. Speaking, singing, whistling, blowing, etc., result when the expired air-stream in the larynx, or in the accessory spaces encounters and overcomes resistance in the upper airways with regular or irregular interruptions. Of course, voice can also be produced in modified form during inspiration.

While the chest cavity is increased through the pull of the inspiratory musculature, and the lung surface comes in contact with the expanding chest walls, the inner spaces of the lungs must be widened also. There now takes place a rarefaction of air and the lungs are expanded through increase of atmospheric pressure. The balance between external and internal air pressure of the lungs cannot take place suddenly on account of the branching of the bronchial tree. The more quickly the lungs are expanded, the greater is the differential pressure; and conversely the slower the lung expansion, the less is the differential pressure. It has been determined that the pressure in the airways during inspiration amounts to one millimetre of mercury. In expiration, the thorax is compressed and the lungs have the air pressed out of them. The more forcibly a person exhales, the greater is the differential pressure. This is also dependent upon the strength with which the inspiratory musculature of the thorax acts in ratio to the expiratory musculature. One can calculate directly the amount of differential pressure in the varying phases of breathing according to the strength of the breathing musculature.

If after a more or less deep inspiration, the larynx closes and the air cannot pass out, pressure increases

according to the more energetic contraction of the respiratory muscles which move the thorax until the larynx is obliged to open suddenly and the confined air is projected out with force, with a characteristic noise (cough), and everything lying free in the airways, such as mucus, pus, foreign body, etc., are driven before it. Therefore, during coughing an expiratory pressure of 80 or more millimetres may be observed, and during the corresponding inspiration a negative pressure of 50 or more mm. During speaking and singing, there are likewise greater variations than in simple breathing, while the expiratory stream must encounter a stronger resistance in tone production than when the glottis is open.

Everyone knows that he can vary the amount of expired and inspired air, but try as we may, we cannot entirely empty the lungs of air. The amount of air left behind after our greatest effort to exhale is called "residual air." It is extremely difficult to calculate the amount of this residual air, but it is supposed that in an adult of average body size it is about 1,500 cubic millimeters. The volume of air which is inhaled and exhaled during quiet breathing is assumed to be about 500 c.mm. The "complementary" or supplementary air volume is the amount which can be inhaled after a quiet inspiration has reached its height, which is about 1,500 c.mm. In the same way "reserve air" is the volume of air which can be expelled after a quiet expiration. The total amount of air which can be taken up during the deepest inspiration and the deepest expiration is called the "lung capacity" or vital capacity. Vital capacity varies according to

sex, age, size of body, weight of body, occupation, exercise and control in the use of respiratory musculature, and also depends upon race and climate, which latter cause very considerable variations. On an average it amounts, in the healthy adult male, to about 3,500 c.mm. and in the healthy female about 2,500 c.mm. The maximum vital capacity is found at the 35th year. From this point upwards to 65 years and downwards to 15 years, an average of 23 c.mm. are to be subtracted for each year of life.

Those persons whose occupation makes great demands upon the muscles, expand their lungs and have an increased vital capacity; for example, professional singers, and blowers of wind instruments. A professional singer of average body size has a vital capacity of about 4,000 c.mm. A female singer from 2,800 to 2,900 c.mm. There is considerable variation in the number of breaths taken at varying ages; for instance, the newborn breathes from 62 to 68 times a minute. At the fifth year, 26 times, at 21 years 18 times, and at from thirty to fifty years of age, 19 times per minute. It is further well known that the number of respirations increases with bodily exercise and psychic excitation. Increase of body temperature, living in a warm room, or bathing in warm water increases the number of respirations. The respirations are also greater in number when standing, greater while sitting than when lying down, and greater during the waking than during the sleeping hours. Stout persons have a greater frequency of respiration than thin persons.

The thoracic cavity (chest) is bounded by the

sternum or breast bone, a part of the spinal column, and the ribs.

The floor of the thoracic cavity is the diaphragm. The apex is made up of the muscles at the base of the neck. According to the motion of the ribs or diaphragm, the size of the chest cavity is increased or decreased.

The types of breathing are abdominal, costal, diaphragmatic, and various combinations of these. There is also a type of breathing in singers which is relegated almost entirely to the upper part of the chest,—this is known as "high chest," clavicular, or shoulder breathing. These various types of breathing are in a sense protective; for were it not so, life would be endangered. If, for instance, the diaphragmatic were the only variety and it were destroyed through tumor or inflammatory formations in the abdominal cavity, the individual would suffocate.

The influence of the various types of breathing upon the voice has a fairly practical significance. In the pedagogical literature of song, there has always been much discussion as to which type is to be used in singing; but, accepting the physiologic facts in the case, such argument ought to be reduced to its lowest terms.

In general it has been assumed and taught that in humans, the sexes show varying types of breathing,—that in quiet, normal breathing the male sex shows the diaphragmatic type, while in females the costal type is more common. This rule is, however, not absolute. In children, for instance, there is no difference in the sexes as to breathing type.

In later life, the breathing type in women is

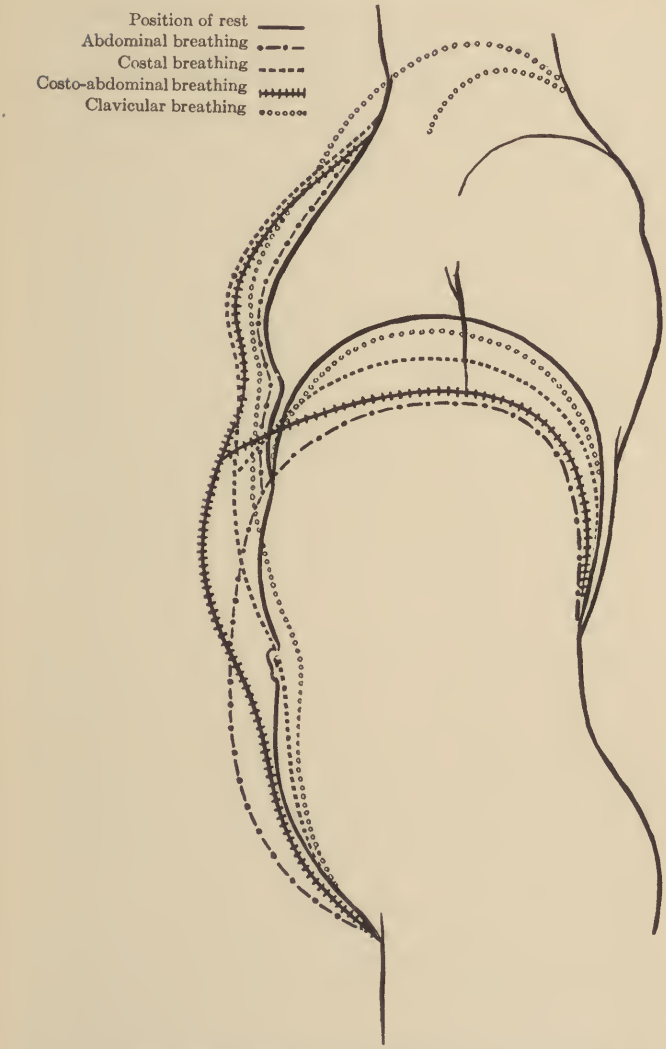


FIG. 18.—Outline of the torso, and position of the diaphragm in the various types of breathing.

scarcely different from that in men, even in hard-working women as compared with those in other stations of life, and the diaphragmatic breathing of the male sex shows no constancy. During sleep, breathing in the male sex is said to be predominantly costal. Observations show that a given or definite type of breathing has little relationship to sex and age.

The amplitude of the up and down movement of the diaphragm may be well studied by the X-ray, since the diaphragm shows a distinct shadow upon the plate; but even before the invention of the X-ray, Hultkrantz and Hasse determined the amplitude of those movements, the correctness of which observations can now be definitely proven. Even upon quiet diaphragmatic breathing, the central tendon of the diaphragm is not still but moves according to the stature of the individual between 5/10 and 1-1/2 c.mm.

In deep abdominal breathing, these excursions amount to from two to four c.mm., and, during coughing, the variation is the greatest even up to seven c.mm. Contraction of the diaphragm narrows the inferior diameter of the chest. Under normal conditions the diaphragm when contracted presses upon the abdominal wall, and at every contraction of the diaphragm, the abdominal wall projects forward.

The costal breathing type is characterized by the fact that it causes enlargement of the thorax through sinking of the ribs. The movement of the ribs is dependent upon their joint connection with the vertebral column. Isolated thoracic breathing does not occur even in experienced breathers; even

if we apply all the energy of the will to isolated expansion of the bony thorax, the diaphragm still makes associated movements of an active inspiratory kind, while the expansion of the chest is actively increased. During clavicular breathing, the diaphragm, as can be determined by the X-ray, makes active inspiratory movements; that is to say, upon inspiration it is contracted, and upon expiration it is elevated.

While, during chest breathing, the inferior chest aperture is widened and elevated, the points of attachment of the diaphragm undergo a change, so that in costo-abdominal breathing, the working of the contracting diaphragm is different than in the isolated diaphragmatic breathing. In costo-abdominal breathing there is an actual change in the maximum of the diaphragm.

APPENDIX A

FUNDAMENTAL PRINCIPLES OF BREATHING

Submitted for discussion at the Convention of the New York State Music Teachers Association held in New York City, June, 1915. Offered by the Committee on Standards.

1. In voice production, the motive power is breath.

2. The breath is provided by the lungs, which are spongy bodies, having no activity of their own beyond elasticity.

3. The lungs are controlled by muscles of respiration.

4. There are two sets of respiratory muscles, one for inspiration and the other for expiration, twenty-two or more in all.

5. The principal muscles of inspiration are the diaphragm and the intercostal muscles that elevate the ribs and evert their lower borders.

6. The chief muscles of expiration are the four sets of abdominal muscles and the intercostal muscles that depress the ribs.

7. The ordinary act of expiration is merely passive, the resilience of the ribs and the elasticity of the lungs being sufficient to produce it.

8. The diaphragm is not a muscle of expiration.

9. The lungs and the respiratory muscles may be termed the Motor of the voice-producing mechanism.

10. As the vibration of the vocal cords which originate the tone, and the continuation of this vibration depend entirely upon the breath, and as the breath depends on the lungs and the respiratory muscles, it follows that it is of the greatest importance that the lungs and the respiratory muscles should be strong and well under the control of the singer; for without mastery of the motive power, all else is unavailing.

11. To achieve this control as quickly as possible, physical exercises, apart from singing, are necessary for the developing and strengthening of the entire breathing apparatus. Such exercises have also a great value in building up the general health, the possession of which is an essential for the successful singer.

12. In order to give the lungs the greatest possible freedom to expand, the chest should be held as high and as expanded as is comfortable.

13. As the bony structure of the chest is largely suspended from above, being attached to other bones at the neck, shoulders and back, and as it is free and unattached below, the greatest motion during respiration should take place about its lower portion, where there is the greatest freedom.

14. Therefore, during singing, if the chest be held high and fairly stationary, the point of greatest motion caused by breathing should be in the region of the diaphragm or below it.

15. The control of the breath would most logically and most naturally be accomplished by the control independently of the muscles of inspiration and the muscles of expiration, or by a balancing or opposition of one set against the other.

16. No attempt to control the breath should be made at the larynx.

17. In general, no action of the breath mechanism should be allowed which would tend to produce interference with the voice mechanism.

18. Perfect control of the breath means:

(a) Ability to fill the lungs to their capacity either quickly or slowly;

(b) Ability to breathe out as quickly or as slowly as occasion demands;

(c) Ability to suspend inspiration, with the throat open, whether the lungs are full or not, and to resume the process at will without having lost any of the already inspired breath;

(d) Ability to exhale under the same restrictions;

(e) Ability to sing and to sustain the voice on an ordinary breath;

(f) Ability to breathe quietly as often as text and phrase permit;

(g) Ability to breathe so that the fullest inspiration brings no fatigue;

(h) Ability so to economize the breath that the reserve is never exhausted;

(i) Ability to breathe so naturally, so unobtrusively, that neither breath nor lack of breath is ever suggested to the listener.

APPENDIX B

FUNDAMENTAL PRINCIPLES OF VOICE PRODUCTION

Submitted for discussion at the New York State Music Teachers Association Convention held in New York City during June, 1915. Offered by the Committee on Standards.

From the Standpoint of the Listener:

I. Sound is a sensation produced through the organ of hearing by means of air-waves.

II. Pitch is that characteristic of the sensation of sound which depends upon the rate at which the air-waves strike the ear drum.

III. Volume is that characteristic of the sensation of sound which depends upon the extent of motion of the ear drum.

IV. Quality is that characteristic of the sensation of sound which depends upon the manner of motion of the ear drum.

From the Standpoint of the Producer:

V. The voice is sound or air-waves. Vocal tone is always complex, being composed of several simple tones (fundamental and over-tones), varying in pitch and in intensity.

VI. Voice production is sound or air-wave production.

VII. Sound, air-wave, or voice production necessitates the use of a mechanism which has three essential elements:

1. A vibrator to originate the air-waves;
2. A pitch mechanism to determine the rate at which the air-waves are originated;
3. A resonance mechanism to reinforce the air-waves started by the vibrator.

VIII. In the voice mechanism the vocal cords serve as a vibrator; the cartilages and muscles of the larynx form the pitch mechanism; and the cavities of the pharynx, mouth and nose form the resonance mechanism.

IX. Pitch of the voice is determined by the length, weight and tension of the vocal cords.

X. Volume of voice depends upon the extent of vibration of the vocal cords, which is caused by breath pressure, and upon resonance.

XI. Quality of voice depends upon the vibration of the vocal cords as a whole and in segments, and upon resonance.

XII. Vocal resonance, which is by far the most important factor in voice production, is due to the sympathetic vibration of the air in the resonance cavities.

XIII. Resonance is more important than breath pressure in relation to volume of tone, and more important than the segmentation of the vocal cords in reference to quality.

XIV. Correct voice production, or the action of the mechanism which produces the perfect vocal tone, consists of the free vibration of the vocal cords, the free motion of the cartilages and muscles of the larynx, and full use of the resonance space. This action produces the natural voice, or the voice which Nature intended a particular mechanism to produce.

XV. Any muscular contraction which prevents

the free vibration of the vocal cords, the free motion of the cartilages and muscles of the larynx, and full use of the resonance space, is termed an interference.

XVI. The principal forms of interference are:

1. The contraction of the muscular fibres of the false cords, which prevents the free vibration of the vocal cords.
2. The contraction of the muscles of the soft palate, which prevents the use of at least one half of the resonance space. *[*Note 1.* It should be remembered that the soft palate may be pulled downwards and forwards as well as upwards and backwards. Assuming that it were possible to shut off the naso-pharynx completely, which it is not, even in extreme contractions and adhesions due to disease, the resonance spaces are still present and active; that is, sound is resonated by air-waves projected against the hard palate. If too great a vibrating volume of air-waves is sent up into the naso-pharynx, a hollow sound results which in speech is known as rhinolalia. The function of the soft palate in singing has been much disputed and bandied about in teachers' discussions, and there is still no unanimity of opinion among them concerning this matter in so far as I am aware.]
3. The contraction of the muscles of the chin and of the back of the tongue, which pre-

* Material in brackets is not in the original, but was inserted by Dr. Voorhees.

vents the correct action of the pitch mechanism.

[4.] [A fourth form of interference should certainly be added; namely, interference caused by physical obstruction. The causes of such obstruction have been rather fully considered in the body of this book. Singing teachers, as a rule, are oblivious to this type, and some have even tried to deny its existence, absurdly claiming that "proper voice placement, breathing," etc., will overcome any apparent abnormality or anomaly. Such an authority as Dr. Floyd S. Muckey, for instance, who claims to have been at one time a laryngologist as well as a teacher of voice, denies the possibility of nodules on the vocal cords, or, more accurately, declares that he has never been able to see them. Interference because of anatomical or pathological configuration should head the list, because it is an actual organic type of disability. The three types or forms set down by the committee of teachers are functional or mental, certainly they may be "willed away."]

XVII. Every form of interference leaves its impress on the quality of the tone. The ear of the teacher must be trained to hear in the tone quality the interference with the mechanism. This is the first step in the removal of interference.

XVIII. The ability to remove interference is based upon a knowledge of the nature of the vocal muscles and of the interfering muscles; viz., the

vocal muscles are involuntary, and the interfering muscles are voluntary. Correct action of the voice mechanism must be induced and cannot be forced. On the other hand, interference, being under the control of the will, can be eliminated.

XIX. The principal business of the voice teacher is to develop the voice.

XX. Voice development consists of the development of the vocal muscles.

[*Note 2.* Theoretically, at least, it would be possible through training to develop vocal muscles as strong as the biceps, yet without development of voice in an artistic sense. One must not overlook the fact that ear training must go along *pari passu* with muscle training. Without proper sensation of vocal vibration in the ears, one can neither speak nor sing correctly. For example, Helen Keller, totally deaf, has been taught to speak; but, having no aural idea of sound, her voice is very decidedly guttural and unpleasant.]

XXI. The principles of muscular development require alternate contraction and relaxation without strain. Short tones give the alternate contraction and relaxation required for development of the vocal muscles. Removal of interference eliminates strain; hence, short, soft tones without interference form the ideal exercise for voice development.

XXII. The laws which regulate voice production are precisely the same in every singer and speaker.

XXIII. Every mechanism which produces the voice is exactly similar. It is composed of the same elements—vocal cords, muscles, and cartilages of the larynx and resonance cavities.

[*Note 3.* This is an incomplete statement. To produce voice at least three elements are necessary:

1. The motor, represented by the thoracic and abdominal muscles.
2. The vibratory, represented by the vocal cords; and
3. The resonantic, represented by the mouth, nasal sinuses and chest wall. (Chest resonance is denied by Dr. Floyd S. Muckey.)]

XXIV. All vocal cords are of the same material—yellow, elastic [connective] tissue.

XXV. In correct voice production, the action of the muscles and cartilages of the larynx is precisely the same in every individual.

XXVI. Those condtions which give full use of the resonance space are identical in every speaker and singer.

XXVII. Differences in the size and shape of the elements of the voice mechanism account for individual characteristics of voices.

XXVIII. The art of singing is composed of two elements, viz: the art of voice production, and the art of interpretation.

XXIX. The art of voice production is based upon the facts of anatomy, physiology and physics. These facts apply to every voice mechanism with equal force and in precisely the same way, and are therefore impersonal.

XXX. The art of interpretation is based upon the personal experience, knowledge, musical taste and feeling of the singer, and is therefore individual.

XXXI. This being true, it is evident that the art of voice production may be standardized, as the same

set of facts may be used to measure the product of every mechanism.

XXXII. It also follows that the art of interpretation cannot be standardized, as each singer's interpretation is based upon a different set of facts.

XXXIII. As there is but one set of facts underlying the art of voice production, there can be but one standard method, and this must conform in every particular to these fundamental facts.

XXXIV. Method in voice development is not only possible, but absolutely essential, while method in interpretation is an impossibility.

QUESTIONNAIRE--VOCAL MEASUREMENT

(AFTER FITZ)

NAME	State race (color)		Give exact height	
STREET.....	Give age nearest birthday		Give exact weight	
TOWN.....	Are you a twin?		Give size of glove	
STATE.....	Are you married?		Give age of your mother when you were born	

*Place the end of a common tape line over the top of the right ear exactly where the ear joins the head, and pass across the forehead over the eyebrows to the same point over the left ear; draw the tape smoothly and mark the number of inches in the space to the right.		Have you any physical disability that would likely interfere with your success as a singer, such as: artificial limbs, hands, feet, eyes or teeth; short upper lip, goiter, extremely narrow roof of mouth; diseased tonsils, impediment of speech, defective sight or hearing, or catarrhal, heart or tubercular trouble?
Place the end of the tape under the right ear exactly where the ear joins the head, and pass over the apex of the nose and cheekbones to the same point under the left ear; draw the tape smoothly and mark the number of inches in the space to the right.		
Place the end of the tape under the right ear exactly where the ear joins the head, and pass over the upper lip to the same point under the left ear; draw the tape smoothly and mark the number of inches in the space to the right.		
Place the end of the tape under the right ear exactly where the ear joins the head, and pass around the tip of the chin to the same point under the left ear; draw the tape smoothly and mark the number of inches in the space to the right.		
*Have some one assist you in taking the measurements.		

Are you a high school or business college graduate?		To what extent have you studied music?	
Are you a good mathematician?		Do you enjoy games of chance and venturesome amusement in general?	
Give your choice of a profession		Are you politically inclined?	

To Be Filled Out By Female Applicant		Are you moody?		To Be Filled Out By Male Applicant	
		Are you sensitive?			
What has been the general condition of your health?		Are you inclined to argue?		Do you have heavy, medium or thin beard?	
Give your age nearest first menstrual period				During boyhood did your voice "break" or was the change gradual?	
What is your strongest domestic tendency?				Give your choice of athletics	

INDEX

A-hem, cause of, 128, 173
Air, complementary, 188
  reserve, 188
  residual, 188
Airways, importance of freedom of, 78
Alboni, Mme., 3
Anesthesia, local, 134
Art, control of voice and body as an, 56
  relation of life to, 13
  singing as an, 61
  tone guided by, 28
Artist, an excellent, 115
  cabaret, 126
  successful, 118
  the great, 112
Arytenoids, crossing of, 126

Begin, when to, 1
  why, 70, 71
Boy, choir, 6
Breathing, abdominal, 192
  chest, 192
  control of, 25, 183
  costal, 192
  incorrect, 9
  mouth, 78, 80
  principles of, 75
    see Appendix I.
  relation of stuttering to, 34
  simplicity of, 59, 80
  types of, 81, 190
Bronchitis, chronic, 174

Capacity, lung, 188
  vital, 188, 189
Career, essentials of, 126
  preparation for vocal, 23, 24
  short cut to, 23
  surgeon's, 184
Caruso, impossibility of imitation of, 18
Childhood, diseases of, 121
  singing in, 2, 3
Clothing, collars and corsets as, 82
  proper, 82
  waists and furs, as, 82, 83
Colds, "chronic," 49, 127
  dangers of neglected, 46, 47, 54
  "grippy," 44, 45, 46
  infectious nature of, 49
  local origin of, 45, 47, 51
  lozenges and troches in, 24, 51
  resistance to, 37, 48
  singing through a, 49, 125
  treatment of, 44, 46, 48, 51, 52, 53
  vaccines in, 54
Composers, study of lives of, 16
Cords, diagnosis from the, 99
  edges of, 58, 132
  hemorrhage into, 130
  mobility of, 134
  secretion on, 128
  vocal, movements of, 29, 30, 33
Cough, mechanism of, 188
  remedies for, 172
Coup de Glotte, 60

Defects, physical, 69
Dentistry, American, 108

Diagnosis, case for, 119
taking time for, 111
Diaphragm (See Chap. XVIII), amplitude of, 192
an inspiratory muscle, 183
control of, 34
functions of, 182
position of, 182, 183
Diet, meat or vegetable, 84
mixed, 83
vocal effort and, 84
wine in the, 84
Diphtheria, 118
Disability, vocal, 127, 131
vocal, latent, 127
Discharge, nasal, 133
post-nasal, 133
Discipline, vocal, 2, 30

Ear, abscess in the, 40, 42, 43, 78, 118
defective vs. musical, 37, 38, 39
message from ear to, 20
pain around the, 41
scarlet fever and the, 36
training of the, 14, 16
water in the, 40, 41
Element, laryngeal, 123, 126
motive-power, 123
resonating, 123
Examination, fear of the, 91, 110
importance of history in the, 95
importance of physical, 76, 78, 101
neglect of, 116, 121
nose and naso-pharynx, 175
points in the, 90, 91, 92, 93
record of the, 94
sputum, 171, 173
Exercises, breathing, 81
phonasthenic, 65
physical, 81, 82
Exercises, recommending, 76
vocal, 3, 9, 63, 113
Experience, stage, 16
Failure, causes of vocal, 118

Falsetto, distinction of head voice from, 25
"flute-like," 26
production of, 26, 31
uvula in, 26
Fatigue (See Phonasthenia), vocal, 24, 104
Fear, neglect and, 102
Fitz, Theophilus E., 8

Garcia, Manuel, 3, 7
Gift, natural, 118
Growths, cordal, 111
question of, 104

Habits, vocal, bad, 23, 28, 33, 34
Hay Fever, alcohol injections in, 157
American Association for study of, 151
calcium chloride in, 156
case of, 129, 151
causes of, 151, 152
foods and, 152
protein tests in, 152, 153
symptoms of, 155
treatment of, 155
vaccines in, 156
Hearing, catarrh and, 37
insidious loss of, 38, 39
islands of, 21
mistakes in, 39
normal range of, 39
soprano voices and, 21
History, case, 128
Hoarseness, phonasthenia as cause of, 128
vocal nodules causing, 110
Hygiene, body, 82

Imitation, effect of listening upon, 14
importance of, 72
influence of phonograph upon, 15, 38
occasional impossibility of, 18
Infection (See Chap. XVIII, p. 170), airways, carriers of, 136, 160
chronic focal, 108
chronic, of lower airways, 170
respiratory, 121, 122, 127
respiratory, acute, 133, 134, 159, 169
treatment of acute, 162, 163, 164, 165, 166
Inhalations, 134, 167
Interference, tongue, 60
vocal, kinds of, 31
Intubation, influence of, 118

Languages, importance of study of, 15
Larynx, asymmetry of, 126
dry, 129
examination of, 32
experiments on, 30
movements of, 32
tests for the, 65
training of, 30, 31
treatment of, 167
ventricles of, 124
Laryngologist, co-operation of, with teacher, 77, 118
examination of voice by, 117
Life, artistic, 116
studio, 103
Lind, Jenny, Mme., 3
Lungs, filling and emptying of, 25

Mackenzie, Sir Morell, 3, 4, 6, 7, 20, 28, 30, 34, 35, 72, 73
Malibran, Mme., 4, 8
Mastoiditis, 42, 101
hearing after, 42
operation for, 42
Measurement, vocal, 8
Messa di Voce, 30, 76
Muscles, chest, poor development of, 120
exercises for, 81
interference with, 57
tensor, fatigue of, 31
throat, gripping of, 28, 29
Music, history of, 16
writers of, 16
Mutation, 3
Fitz's rule of, 8
in female, 5
in M. Lablache, 6
in old age, 5
use of voice during, 7

Naso-Pharynx, 26
examination of, 98
growths in, 98
resonance in, 124
Neglect, tendency to, 103
Nodules, case of, 130
causes of, 112
removal of, 114
results of, 113
soft, 113
vocal, 22, 99, 110, 111, 134
Nose, bactericidal secretion of, 48
blowing the, 41
crusts in the, 77
douching the, 78, 79, 80
early examination of, 62, 97
growths and deformities of, 58, 64, 70
"hump," 105, 106
infections of, 48
septum of the, 78, 96, 125

Obstruction, cordal, 128
nasal, 104, 105

Pain, importance of, 101
Patti, Adelina, Mme., 3

Phonasthenia (See Fatigue, vocal)
causes of, 6, 22, 28, 55, 58, 64
chronic diseases and, 58
onset of, 61, 128
prevention of, 62
relation of age and sex to, 57
symptoms of, 58, 59
tests for, 65
treatment of, 62, 63, 64, 65
Physician, voice, 118
Pitch, idea of, 37
Placement, bad, 24, 86
shifting of, 22
Poison Ivy, 153
Pollen, air-borne, 154, 156
effect on singer, of, 154
Polypi, nasal, 105, 125
Prevention, importance of, 102
Production (See Appendix II), artificial, 26
change of method of, 76
fundamentals of voice, 132
most essential feature of, 30
principles of, 75
throaty, 2, 28
Puberty, larynx at, 4, 5
Pupil, control of voice of, 30
happiness of the, 117
reliance of, 12

Ramfis, performance of, 115
Range, building the, 22
maximum, 22
three octaves of, 132
Region, subglottic, 127
Registers, explanation of, 21
"long reed," 27, 31
mistaken ideas of the, 74
"short reed," 26
speaking, 64
uniting of the, 73
use of several, 30
vocal, 21
Resonance, causes of poor, 78
chest, 124
Resonance, defective nasal, 103, 104, 125
testing nasal, 105, 134
Rheumatism, focal origin of, 137
Rhinolalia, 129
Rodriguez, M. Visconte, 7
Rousseau, 26

Sensitization, protein, 129
Septum, deviation of, 104, 120, 123, 125, 130
in children, 123
nasal, 104
posterior edge of, 125
Scarlet Fever, voice and, 118
Singer, criticism of, 17
demands upon, 17
ignorance of young, 127
Singing, esthetics of, 13, 28
forte, 72
greatest effects of, 21
"methods" of, 60
psychology of, 116
stutterers and, 21
the art of, 60, 61
Sinuses, children's, 122
latent disease of, 133
nasal, 122
X-ray examination of, 176
Society, demands of, 17
Song, gift of, 10
Herbert Spencer's definition of, 20
mastery of art of, 34
relation of speech to, 19
Soprano, case of a lyric, 130
making of, 21
types of, 11
what happens to boy, 6
Sound, laryngeal production of, 28
noise versus, 38
Speech, defects of, 34
relation of song to, 19

Speech, sound and, 28
vocal compass in, 21
Spencer, Herbert, definition of song by, 20
Sports, bicycling, swimming, 85
walking, 85
Standardization, 70
effort to bring about, 74, 75
music teachers' efforts at, 75
Strain, vocal, 113
Stutterers, influence of singing on, 21
stammerers should avoid, 34
use of strychnia in, 34
Surgery, excellence of, 105
plastic, 105, 107

Talent, demand for, 16
histrionic, 106, 118
Teacher, blaming the, 126
choice of a, 71
co-operation of laryngologist with, 67, 68, 75
man or woman, 72
skilled, 114, 121
the instrumentalist as, 71
the intelligent, 74
the successful, 72, 73
Teaching, importance of good, 12, 35, 67
Teeth, extraction of, 109
importance of good, 108
missing, 109
swallowing the, 109
Throat, clearing the, 128
dry, 127, 128
relaxed, 128
sore, 136
Timbre, influence of race upon, 11
Tone, beauty and fullness of, 28, 69
"big," 11, 24, 61
dampening of, 125
effect of dry throat upon, 45
production of, 11, 112
Tone, unsteady, 128
working out the, 23
Tongue, teeth and, 109
Tonsils, adenoids and, 122, 136
chronic disease of, 133
construction of, 137
diseased, 134, 137
effect of removal of, 139, 140, 141, 142, 143, 144, 145, 146, 147, 148, 149, 150
examination of the, 98, 136
function of, 136, 137
pillars of, 31, 64, 70, 134
removal of, 130, 139, 149
Tonsilitis, symptoms of, 137, 138
Toxin, absorbed, 153
body manufacture of, 137
germ, 137
Trachea, bleeding from the, 174
inflammation of, 173
inspection of, 175
Travel, influence of, 16
railway, 84
Training, bad, 23
breath, 81
methods of, 76
question of foreign, 15
Treatment, bactericidal, 179
bedside, 168
direct, 178
factors in, 176
indirect, 172
vaccine, 176
Tremolo, beginners', 24
causes of, 24
Turbinates, enlarged, 105, 121, 130

Uvula, position of, 26, 31
removal of, 122

Viardot, Mme., 4, 8
Vigor, mental and bodily, 102
Vocalization, approximation of cords during, 111
deferring of, 2

Vocalization, perfection in, 109
seriousness of, 14
Voice, analysis of the, 63, 76
bad use of a good, 127
"broken," 6, 8
critical point of, 22
daily exercise of, 24
duration of, 68, 86
Eunuch's, 21
forcing of, 22
head and chest, 26, 27
hearing one's own, 25
hygiene of, 62, 78
influence of sex upon, 8, 20, 21
loss of, 149
mechanism of, 57, 123
muscular development and the, 103
mutation of, 3
Voice, possibilities of, 10
predetermination of, 8
range of, 18
"resetting" the, 131
rest of, 33, 85
"screwing up" the, 59, 99, 100
"shipwreck" of, 22
skillful use of, 22
smoothness of, 29
three elements of production of, 123
the unmusical, 56
"throaty," 28
trying out the, 117
two uses of, 19, 30
violin and the, 72
vowel development of the, 20
when to begin cultivation of the, 1, 2
Vowels, use of, 20